Gis For Environmental Decision Making Innovations In Gis

Decision-Making in Environmental Health examines the need for information in support of decision-making in environmental health. It discusses indicators of environmental health, methods of data collection and the assessment of exposure to and the health impact of different environmental risk factors.

Access, distribution and processing of Geographic Information (GI) are basic preconditions to support strategic environmental decision-making. The heterogeneity of information on the environment today available is driving a wide number of initiatives, on both sides of the Atlantic, all advocating both the strategic role of proper management and processing of environme- related data as well as the importance of harmonized IT infrastructures designed to better monitor and manage the environment. The extremely wide range of often multidimensional environmental information made available at the global scale poses a great challenge to technologists and scientists to find extremely sophisticated yet effective ways to provide access to relevant data patterns within such a vast and highly dynamic information flow. In the past years the domain of 3D scientific visualization has developed several solutions designed for operators requiring to access results of a simulation through the use of 3D visualization that could support the understanding of an evolving phenomenon. However 3D data visualization alone does not provide model and hypothesis-making neither it provide tools to validate results. In order overcome this shortcoming, in recent years scientists have developed a discipline that combines the benefits of data mining and information visualization, which is often referred to as Visual Analytics (VA).

GIS for Environmental Applications provides a practical introduction to the principles, methods, techniques and tools in GIS for spatial data management, analysis, modelling and visualisation, and their applications in environmental problem solving and decision making. It covers the fundamental concepts, principles and techniques in spatial data, spatial data management, spatial analysis and modelling, spatial visualisation, spatial interpolation, spatial statistics, and remote sensing data analysis, as well as demonstrates the typical environmental applications of GIS, including terrain analysis, hydrological modelling, land use analysis and modelling, ecological modelling, and ecosystem service valuation. Case studies are used in the text to contextualise these subjects in the real world, examples and detailed tutorials are provided in each chapter to show how the GIS techniques and tools introduced in the chapter can be implemented using ESRI ArcGIS (a popular GIS software system for environmental applications) and other third party extensions to ArcGIS to address. The emphasis is placed on how to apply or implement the concepts and techniques of GIS through illustrative examples with step-by-step instructions and numerous annotated screen shots. The features include: Over 350 figures and tables illustrating how to apply or implement the concepts and techniques of GIS Learning objectives along with the end-of-chapter review questions Authoritative references at the end of each chapter GIS data files for all examples as well as PowerPoint presentations for each chapter downloadable from the companion website. GIS for Environmental Applications weaves theory and practice together, assimilates the most current GIS knowledge and tools relevant to environmental research, management and planning, and provides step-by-step tutorials with practical applications. This volume will be an indispensable resource for any students taking a module on GIS for the environment.

Spatial dimensions need to be properly captured if modeling and engineering techniques are to be successfully applied in addressing environmental problems. The links between the geographical information systems (GIS) that capture this data, simulation modeling, and engineering offer tremendous possibilities for building versatile support systems fo

Encyclopedia of Geography

GIS and Environmental Decisionmaking to Aid Smelter Reclamation Planning

Handbook of Decision Making

Decision Making with GIS : the Fourth Dimension : GIS 94 Symposium Proceedings : Eighth Annual Symposium on Geographic Information Systems in Forestry, Environmental and Natural Resources Management

International Perspectives on Global Environmental Change

Focusing on the Southeast Michigan Initiative Geographic Area and Contaminated Sediment Issues

Environmental applications have long been a core use of GIS. However, the effectiveness of GIS-based methods depends on the decision-making frameworks and contexts within which they are employed. GIS for Environmental Decision-Making takes an interdisciplinary look at the capacities of GIS to integrate, analyze, and display data on which decisions must be based. It provides a broad prospective on the current state of GIS for environmental decision-making and emphasizes the importance of matters related to data, analysis, and modeling tools, as well as stakeholder participation. The book is divided into three sections, which effectively relate to three key aspects of the decision-making process as supported by GIS: data required, tools being developed, and aspects of participation. The first section stresses the ability to integrate data from different sources as a defining characteristic of GIS and illustrates the benefits that this can bring in the context of deriving land-use and other information. The second section discusses a range of issues concerning the use of GIS for suitability mapping and strategic planning exercises, through illustrative examples. The last section of the book focuses on the use of GIS-based techniques to facilitate public participation in decision-making processes. In particular, it provides an overview of developments in this area, concentrating on how GIS, modeling, and 3D landscape visualization techniques are gradually achieving closer integration. Given the complex challenges presented by global environmental change, GIS for Environmental Decision-Making provides a clear illustration of how the use of GIS can make significant contributions to trans-disciplinary initiatives to address environmental problems.

Decision making in environmental projects is typically a complex and confusing process characterized by trade-offs between socio-political, environmental, and economic impacts. Comparative Risk Assessment (CRA) is a methodology applied to facilitate decision making when various activities compete for limited resources. CRA has become an increasingly accepted research tool and has helped to characterize environmental profiles and priorities on the regional and national level. CRA may be considered as part of the more general but as yet quite academic field of multi-criteria decision analysis (MCDA). Considerable research in the area of MCDA has made available methods for applying scientific decision theoretical approaches to multi-criteria problems, but its applications, especially in environmental areas, are still limited. The papers show that the use of comparative risk assessment can provide the scientific basis for environmentally sound and cost-efficient policies, strategies, and solutions to our environmental challenges.

GIS for Sustainable Development examines how GIS applications can improve collaboration in decision making among those involved in promoting sustainable development. This volume reviews leading GIScience, providing an overview of research topics and applications that enable GIS newcomers and professionals to apply GIScience methods to susta

While traditional apsects of GIS have been growing rapidly in recent years, new developments have focused on the geographic information service and delivery, which will realise the benefits of spatial information to the community. The analysis and application of spatial information for decision support systems is an important development in realising these benefits. This book is a collection of peer-reviewed articles presented at the ISPRS Workshop on Spatial Analysis and Decision Making in Hong Kong in 2003. It covers topics such as image-based spatial analysis and decision making; 3-D modelling and analysis; general spatial analysis methodology; web- and mobile-based analysis; knowledge-based systems; integrated systems; visualisation and representation methodology, and some application systems.

Taking Stock of Environmental Assessment

Environmental planning for communities : a guide to the environmental visioning process utilizing a geographic information system (GIS).

Spatial Modeling in GIS and R for Earth and Environmental Sciences

Regional and Urban GIS

GIS Environmental Modelling and Engineering

A Decision Support Approach

Although interest in Spatial Decision Support Systems (SDSS) continues to grow rapidly in a wide range of disciplines, students, planners, managers, and the research community have lacked a book that covers the fundamentals of SDSS along with the advanced design concepts required for building SDSS. Filling this need, Spatial Decision Support Systems: Principles and Practices provides a comprehensive examination of the various aspects of SDSS evolution, components, architecture, and implementation. It integrates research from a variety of disciplines, including the geosciences, to supply a complete overview of SDSS technologies and their application from an interdisciplinary perspective. This groundbreaking reference provides thorough coverage of the roots of SDSS. It explains the core principles of SDSS, how to use them in various decision making contexts, and how to design and develop them using readily available enabling technologies and commercial tools. The book consists of four major parts, each addressing different topic areas in SDSS: Presents an introduction to SDSS and the evolution of SDSS Covers the essential and optional components of SDSS Focuses on the design and implementation of SDSS Reviews SDSS applications from various domains and disciplines—investigating current challenges and future directions The text includes numerous detailed case studies, example applications, and methods for tailoring SDSS to your work environment. It also integrates sample code segments throughout. Addressing the technical and organizational challenges that affect the success or failure of SDSS, the book concludes by considering future directions of this rapidly emerging field of study.

This edited collection analyzes the appropriate balance between conservation and development and the place for participation and popular protest in environmental assessment. Examining the relationship between law, environmental governance and the regulation of decision-making, this volume takes a reflective and contextual approach, using wide range of theories, to explore the key features of modern environmental assessment. This collection of work from experts in the area in the US and Europe provides a detailed treatment of key issues in environmental assessment, encouraging an appreciation of where environmental assessment has come from and how it could develop in the future. A 'stocktaking' exercise, this volume encompasses a broad range of concerns, timescales and legal and policy contexts. Individual chapters include discussions on: the development of EIA in the United States and Europe the interrelation of environmental assessment with other regulatory regimes (water protection, environmental justice initiatives, the European spatial strategy) the prospects for the digitalization of the environmental assessment process the development and use of environmental impact assessment by the European Commission, the UN/ECE and NGOs. Looking at the roots and current state of environmental assessment in the US and Europe and giving the reader a good sense of the political, scientific and technological settings in which environmental assessment has developed, this book critically examines the dilemmas the law has found itself in since the regulation of environmental assessment.

"Montello and Sutton is one of the best texts I've used in seminars on research methodology. The text offers a clear balance of quantitative vs. qualitative and physical vs. human which I've found particularly valuable. The chapters on research ethics, scientific communication, information technologies and data visualization are excellent" - Kenneth E. Foote, Department of Geography, University of Colorado at Boulder This is a broad and integrative introduction to the conduct and interpretation of scientific research, covering both geography and environmental studies. Written for undergraduate and postgraduate students, it: Explains both the conceptual and the technical aspects of research, as well as all phases of the research process Combines approaches in physical geography and environmental science, human geography and human-environment relations, and geographic and environmental information techniques (such as GIS, cartography, and remote sensing) Combines natural and social scientific approaches common to subjects in geography and environmental studies Includes case studies of actual research projects to demonstrate the breadth of approaches taken It will be core reading for students studying scientific research methods in geography, environmental studies and related disciplines such as planning and earth science.

Over time, thought processes and decision making styles evolved and were shaped by theological, philosophical, political, social, and environmental factors and trends. Recently, advances in technology have borne an unprecedented influence on our social environment. Contemporary thinking inevitably reflects this influence and moves us from a linear,

Understanding Urban Metabolism

Tools to Aid Environmental Decision Making

GIS and Evidence-Based Policy Making

Law, Policy and Practice

Modelling in a GIS Environment

Spatial Decision Support Systems

The significance of modeling in managing the environment is well recognized from scientific and engineering perspectives as well as in the political arena. Environmental concerns and issues of sustainability have permeated both public and private sectors, particularly the need to predict, assess and mitigate against adverse impacts that arise from continuing development and use of resources. Students need to be made aware of these issues. Practitioners should enrich their knowledge and skills in these areas. This book focuses on the modeling, rather than on data collection or visualization.

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.

As effective organizational decision making is a major factor in a company's success, a comprehensive account of current available research on the core concepts of the decision support agenda is in high demand by academicians and professionals. Through 110 authoritative contributions by over 160 of the world's leading experts the Encyclopedia of Decision Making and Decision Support Technologies presents a critical mass of research on the most up-to-date research on human and computer support of managerial decision making, including discussion on support of operational, tactical, and strategic decisions, human vs. computer system support structure, individual and group decision making, and multi-criteria decision making.

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.

Beyond Maps

Spatial Multicriteria Decision Making and Analysis

GIS for Environmental Applications

GIS for Environmental Decision-Making

Advances in Spatial Analysis and Decision Making

Public Participation and Technological Decision Making

Decision making in land management involves preferential selection among competing alternatives. Often, such choices are difficult owing to the complexity of the decision context. Because the analytic hierarchy process (AHP, developed by Thomas Saaty in the 1970s) has been successfully applied to many complex planning, resource allocation, and priority setting problems in business, energy, health, marketing, natural resources, and transportation, more applications of the AHP in natural resources and environmental sciences are appearing regularly. This realization has prompted the authors to collect some of the important works in this area and present them as a single volume for managers and scholars. Because land management contains a somewhat unique set of features not found in other AHP application areas, such as site-specific decisions, group participation and collaboration, and incomplete scientific knowledge, this text fills a void in the literature on management science and decision analysis for forest resources.

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.

This book is unique in identifying and presenting tools to environmental decision-makers to help them improve the quality and clarity of their work. These tools range from software to policy approaches, and from environmental databases to focus groups. Equally of value to environmental managers, and students in environmental risk, policy, economics and law.

Understanding Urban Metabolism addresses the gap between the bio-physical sciences and urban planning and illustrates the advantages of accounting for urban metabolism issues in urban design decisions. Urban metabolism considers a city as a system, and distinguishes between energy and material flows as its components. Based on research from the BRIDGE project, this book deals with how the urban surface exchanges and transforms energy, water, carbon and pollutants in cities. This book also introduces a new method for evaluating how planning alternatives can modify the physical flows of urban metabolism components and how environmental and socioeconomic components interact. The inclusion of sustainability principles into urban planning provides an opportunity to place the new knowledge provided by bio-physical sciences at the centre of the planning process, but there is a strong need to bridge knowledge and practice, as well as for a better dissemination of research results and exchange of best practice. This book meets that need and provides the reader with the necessary tools to integrate an understanding of urban metabolism into urban planning practice.

Spatial Analysis

Civil Society Participation in Environmental Planning and Decision Making Towards Environmental Protection in Tioman Island /GIS Technology

GIS and Decision Making in Local Government

Development of a Database and GIS to Support Environmental Decision Making and Data Analysis

The Case of GIS

Decision-Making in Environmental Health

Although much has been written on evidence-based policy making, this is the first volume to address the potential of GIS in this arena. GIS and Evidence-Based Policy Making covers the development of new methodological approaches, emphasizing the identification of spatial patterns in social phenomena. It examines organizational issues, including the development of new tools for policy making. This

text brings together the results of researchers working across the entire spectrum of evidence-based policy making, focusing on the exploration for new data sources and examining ways to bring GIS-based methods to the public and to policy-makers.

*Spatial Analysis: Modelling in a GIS Environment Edited by PaulLongley and Michael Batty Digital data and information are usedincreasingly by academics, professionals, local authorities, andgovernment departments. Powerful new technologies, such asgeographic information systems (GIS), are being developed toanalyse such data, and GIS technologies are rapidly becoming partof the emergent world digital infrastructure. This book shows howcomputer methods of analysis and modelling, built around GIS, canbe used to identify ways in which our cities and regions might bebetter planned and understood. The contributors to this book areall actively involved in research using geographic informationsystems. This book will be valuable reading for: * Geographers, researchers, and regional analysts * Population theorists and regional economists with interests inlarge-scale demographic and employment data * Planners and policy-makers who wish to use GIS to improve theirdecision making * Business analysts who wish to explore markets using the mostrecent advances in digital spatial data technology * All those interested in geodemographics Paul Longley is Professor of Geography at the Department ofGeography, University of Bristol, United Kingdom. Michael Batty isProfessor of Spatial Analysis and Planning at the UniversityCollege London. United Kingdom.*

"The definitive guide to a technology that succeeds or fails depending upon our ability to accommodate societal context and structures. This handbook is lucid, integrative, comprehensive and, above all, prescient in its interpretation of GIS implementation as a societal process." - Paul Longley, University College London "This is truly a handbook - a book you will want to keep on hand for frequent reference and to which GIS professors should direct students entering our field... Selection of a few of the chapters for individual attention is difficult because each one contributes meaningfully to the overall message of this volume. An important collection of articles that will set the tone for the next two decades of discourse and research about GIS and society." - Journal of Geographical Analysis Over the past twenty years research on the evolving relationship between GIS and Society has been expanding into a wide variety of topical areas, becoming in the process an increasingly challenging and multifaceted endeavour. The SAGE Handbook of GIS and Society is a retrospective and prospective overview of GIS and Society research that provides an expansive and critical assessment of work in that field. Emphasizing the theoretical, methodological and substantive diversity within GIS and Society research, the book highlights the distinctiveness and intellectual coherence of the subject as a field of study, while also examining its resonances with and between key themes, and among disciplines ranging from geography and computer science to sociology, anthropology, and the health and environmental sciences. Comprising 27 chapters, often with an international focus, the book is organized into six sections: Foundations of Geographic Information and Society Geographical Information and Modern Life Alternative Representations of Geographic Information and Society Organizations and Institutions Participation and Community Issues Value, Fairness, and Privacy Aimed at academics, researchers, postgraduates, and GIS practitioners, this Handbook will be the basic reference for any inquiry applying GIS to societal issues.

GIS for Environmental Decision-MakingCRC Press

Eighth Annual Symposium on Geographic Information Systems in Forestry, Environmental and Natural Resources Management, February 21-24, 1994, Vancouver, British Columbia, Canada

GIS for Sustainable Development

Geographical Information Processing and Visual Analytics for Environmental Security

A practical approach

A Critical Review of GIS Uses Related to the United States Air Force Environmental Work

GIS, Environmental Modeling and Engineering

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

Environmental change is increasingly considered a critical topic for researchers across multiple disciplines, as well as policy makers throughout the world. Mounting evidence shows that environments in every part of the globe are undergoing tremendous human-induced change. Population growth, urbanization and the expansion of the global economy are putting increasing pressure on ecosystems around the planet. To understand the causes and consequences of environmental change, the contributors to this book employ spatial and non-spatial data, diverse theoretical perspectives and cutting edge research tools such as GIS, remote sensing and other relevant technologies. International Perspectives on Global Environmental Change brings together research from around the world to explore the complexities of contemporary, and historical environmental change. As an InTech open source publication current and cutting edge research methodologies and research results are quickly published for the academic policy-making communities. Dimensions of environmental change explored in this volume include: Climate change Historical environmental change Biological responses to environmental change Land use and land cover change Policy and management for environmental change

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

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 decision-making units within and between organisations in most societies and are more often than not very complex structures. The use of Geographic Information Systems (GIS) Groupware can be used in several practical contexts to make sure that spatial decision problems are overcome in the most effective way. A fundamental aspect of a spatial decision problem is the matter of location. The complexity of spatial decision problems result from the multiplicity of stakeholders involved, their often conflicting interests, and the intangible variables of the decision environment. Examples of such problems include: where to locate a public facility, which brownfield redevelopment strategy to choose, which sites to select for environmental restoration, or which comprehensive land use plan to adopt. Good solutions to such problems -if they exist at all- are characterised by a certain minimum level of secretarial support; hence the decision-making process should involve experts, citizens, and interest groups alike. Such a collaborative approach to spatial decision-making needs methodology, tools, and application examples to inspire its adoption and more widespread use. This book sets out the key to the collaborative spatial decision-making approach: its theoretical basis, the requisite tools, and a number of application examples. GIS professionals and researchers should find this an invaluable guide to an emerging area of GIS

The SAGE Handbook of GIS and Society

A Case Study Approach

Comparative Risk Assessment and Environmental Decision Making

Proceedings of the ISPRS Workshop on Spatial Analysis and Decision Making: Hong Kong, 3-5 December 2003

Using Geographic Information Systems for Environmental Decision Making

Evaluating the Use of GIS by Public Participants in Environmental Decision-making Processes

This paper describes and assesses the uses of Geographical Information System (GIS) and methods that provide inputs to GIS to aid environmental decision-making in many aspects of environmental risk analysis (R/A) under the USAF initiative for environmental work. Sound science and reliable 'tools' used in environmental work to calculate risk and to reduce the often-large uncertainties in environmental and health risk analysis can be coupled with GIS.

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.

Using the varied case studies, this comprehensive resource looks beyond the mechanics of systems and screens to show how local governments can make geographic information systems true management tools. Case studies provide a framework of understanding of the unique capabilities of GIS. 50 maps.

Encyclopedia of Decision Making and Decision Support Technologies

GeoSpatial Visual Analytics

A Geographic Information Sciences Approach

Decision Making with GIS, the Fourth Dimension

A Tool for Urban Planning

GIS for Group Decision Making