

Computer Cartography And Cartographic Knowledge

Map making and, ultimately, map thinking is ubiquitous across literature, cosmology, mathematics, psychology, and genetics. We partition, summarize, organize, and clarify our world via spatialized representations. Our maps and, more generally, our representations seduce and persuade; they build and destroy. They are the ultimate record of empires and of our evolving comprehension of our world. This book is about the promises and perils of map thinking. Maps are purpose-driven abstractions, discarding detail to highlight only particular features of a territory. By preserving certain features at the expense of others, they can be used to reinforce a privileged position. *When Maps Become the World* shows us how the scientific theories, models, and concepts we use to intervene in the world function as maps, and explores the consequences of this, both good and bad. We increasingly understand the world around us in terms of models, to the extent that we often take the models for reality. Winther explains how in time, our historical representations in science, in cartography, and in our stories about ourselves replace individual memories and become dominant social narratives—they become reality, and they can remake the world.

Classics in Cartography provides an intellectually-driven reinterpretation of a selection of ten touchstone articles in the development of mapping scholarship over the last four decades. The 'classics' are drawn exclusively from the international peer-review journal *Cartographica* and are reprinted in full here. They are accompanied by newly commissioned reflective essays by the original article authors, and other eminent scholars, to provide fresh interpretation of the meaning of the ideas presented and their wider, lasting impact on cartographic research. The book provides an equal balance of influential articles from the past and current commentaries which highlight their impact and current context. Read in combination the original 'classic' articles and these new reflective essays demonstrate how cartography works as a powerful representational form and explores how various different aspects of mapping practice have been conceptualized by an influential set of academic researchers. *Collates 'classic' articles from four decades of the journal Cartographica* Brings key articles up-to-date with contemporary interpretative essays by the leading scholars in mapping research Themes covered are the epistemological of mapping practice, the ontological underpinnings of cartographic representation, and the contested societal implications of maps *Evaluates the progression of the field of cartographic research and demonstrates how new theoretical ideas originate, develop and circulate* Provides a signpost for students and new researchers on the key articles in cartography to read and reflect upon

Exploratory data analysis (EDA) is about detecting and describing patterns, trends, and relations in data, motivated by certain purposes of investigation. As something relevant is detected in data, new questions arise, causing specific parts to be viewed in more detail. So EDA has a significant appeal: it involves hypothesis generation rather than mere hypothesis testing. The authors describe in detail and systemize approaches, techniques, and methods for exploring spatial and temporal data in particular. They start by developing a general view of data structures and characteristics and then build on top of this a general task typology, distinguishing between elementary and synoptic tasks. This typology is then applied to the description of existing approaches and

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technologies, resulting not just in recommendations for choosing methods but in a set of generic procedures for data exploration. Professionals practicing analysis will profit from tested solutions – illustrated in many examples – for reuse in the catalogue of techniques presented. Students and researchers will appreciate the detailed description and classification of exploration techniques, which are not limited to spatial data only. In addition, the general principles and approaches described will be useful for designers of new methods for EDA.

Geographical Information is essential for the layout, planning and management of space, and involves taxation, cadastral data bases, environmental policy, water management, maintenance and protection of pipeline systems, terrain modelling and the making of maps. The third European conference brought together some 300 speakers and authors from academia, industry and government. The resulting monumental work is representative for the state-of-the-art of knowledge and information on Geographical Information.

This book provides an introduction to HCI and usability aspects of Geographical Information Systems and Science. Its aim is to introduce the principles of Human-Computer Interaction (HCI); to discuss the special usability aspects of GIS which designers and developers need to take into account when developing such systems; and to offer a set of tried and tested frameworks, matrices and techniques that can be used within GIS projects. Geographical Information Systems and other applications of computerised mapping have gained popularity in recent years. Today, computer-based maps are common on the World Wide Web, mobile phones, satellite navigation systems and in various desktop computing packages. The more sophisticated packages that allow the manipulation and analysis of geographical information are used in location decisions of new businesses, for public service delivery for planning decisions by local and central government. Many more applications exist and some estimate the number of people across the world that are using GIS in their daily work at several millions. However, many applications of GIS are hard to learn and to master. This is understandable, as until quite recently, the main focus of software vendors in the area of GIS was on the delivery of basic functionality and development of methods to present and manipulate geographical information using the available computing resources. As a result, little attention was paid to usability aspects of GIS. This is evident in many public and private systems where the terminology, conceptual design and structure are all centred around the engineering of GIS and not on the needs and concepts that are familiar to the user. This book covers a range of topics from the cognitive models of geographical representation, to interface design. It will provide the reader with frameworks and techniques that can be used and description of case studies in which these techniques have been used for computer mapping application.

The relationship of texts and maps, and the mappability of literature, examined from Homer to Houellebecq. Literary authors have frequently called on elements of cartography to ground fictional space, to visualize sites, and to help readers get their bearings in the imaginative world of the text. Today, the convergence of digital mapping and globalization has spurred a cartographic turn in literature. This book gathers leading scholars to consider the relationship of literature and cartography. Generously illustrated with full-color maps and visualizations, it offers the first systematic overview of an emerging approach to the study of literature. The

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literary map is not merely an illustrative guide but represents a set of relations and tensions that raise questions about representation, fiction, and space. Is literature even mappable? In exploring the cartographic components of literature, the contributors have not only brought literary theory to bear on the map but have also enriched the vocabulary and perspectives of literary studies with cartographic terms. After establishing the theoretical and methodological terrain, they trace important developments in the history of literary cartography, considering topics that include Homer and Joyce, Goethe and the representation of nature, and African cartographies. Finally, they consider cartographic genres that reveal the broader connections between texts and maps, discussing literary map genres in American literature and the coexistence of image and text in early maps. When cartographic aspirations outstripped factual knowledge, mapmakers turned to textual fictions. Contributors Jean-Marc Besse, Bruno Bosteels, Patrick M. Bray, Martin Brückner, Tom Conley, Jörg Dünne, Anders Engberg-Pedersen, John K. Noyes, Ricardo Padrón, Barbara Piatti, Simone Pinet, Clara Rowland, Oliver Simons, Robert Stockhammer, Dominic Thomas, Burkhardt Wolf

Focuses on the process by which manually crafting interactive, hypertextual maps clarifies one's own understanding, communicates it to others, and enables collective intelligence. The authors see mapping software as visual tools for reading and writing in a networked age. In an information ocean, the challenge is to find meaningful patterns around which we can weave plausible narratives. Maps of concepts, discussions and arguments make the connections between ideas tangible - and critically, disputable. With 22 chapters from leading researchers and practitioners (5 of them new for this edition), the reader will find the current state-of-the-art in the field. Part 1 focuses on knowledge maps for learning and teaching in schools and universities, before Part 2 turns to knowledge maps for information analysis and knowledge management in professional communities, but with many cross-cutting themes: · reflective practitioners documenting the most effective ways to map · conceptual frameworks for evaluating representations · real world case studies showing added value for professionals · more experimental case studies from research and education · visual languages, many of which work on both paper and with software · knowledge cartography software, much of it freely available and open source · visit the companion website for extra resources: books.kmi.open.ac.uk/knowledge-cartography Knowledge Cartography will be of interest to learners, educators, and researchers in all disciplines, as well as policy analysts, scenario planners, knowledge managers and team facilitators. Practitioners will find new perspectives and tools to expand their repertoire, while researchers will find rich enough conceptual grounding for further scholarship.

This book reviews and summarizes the development and achievement in cartography and geographic information engineering in China over the past 60 years after the founding of the People's Republic of China. It comprehensively reflects cartography, as a traditional discipline, has almost the same long history with the world's first culture and has experienced extraordinary and great changes. The book consists of nineteen thematic chapters. Each chapter is in accordance with the unified directory structure, introduction, development process, major study achievements, problem

and prospect, representative works, as well as a lot of references. It is useful as a reference both for scientists and technicians who are engaged in teaching, researching and engineering of cartography and geographic information engineering.

The joint symposium of ICA commissions is always one of the most important event for cartographers. This joint seminar in Orleans was connected to 25th International Cartographic Conference, Paris. Works were presented by members of the commissions on: Cartography and Children, Cartographic Education and Training, Maps and the Internet, Planetary Cartography, Early Warning and Disaster Management.

Competitive intelligence (CI) is about gathering and analyzing environmental information for strategic purposes. This work shows that to select the right information and communication technology (ICT) tools for CI, an organization needs to understand the role of ICT in the CI-process.

This text is the inaugural book in Taylor and Francis's GISDATA series, and is derived from the specialist workshop convened under the auspices of the European Science Foundation's GISDATA Scientific Programme. Generalisation is an integrating tool for the analysis and presentation of spatial data. Effective spatial data analysis requires multiple views of the world at various scales with different thematic layers of representation. Generalisation is a key mechanism in this process, as it filters out information which is required for particular scales or layers; hence it is critical to implement full and comprehensive generalisation capabilities in a GIS, something with which few current GIS are equipped.; This book overviews the core and as-yet unresolved issues surrounding the achievement of this goal, and presents various alternatives - both speculative views and practical examples - in the areas of automated generalisation, vis-a-vis problems such as object simplification and placement. At the same time it distinguishes between modelling with generalisation and graphical representation, and adopts a model-building perspective. It also describes artificial intelligence techniques for implementing automated generalised routines, and addresses issues of data quality and production.; The text is organized into six parts: an introduction; generic issue; object-orientated methods and knowledge-based modelling; knowledge acquisition and representation; data quality; and operation and implementation.

WINNER OF THE CANTEMIR PRIZE 2012 awarded by the Berendel Foundation The Map Reader brings together, for the first time, classic and hard-to-find articles on mapping. This book provides a wide-ranging and coherent edited compendium of key scholarly writing about the changing nature of cartography over the last half century. The editorial selection of fifty-four theoretical and thought provoking texts demonstrates how cartography works as a powerful representational form and explores how different mapping practices have been conceptualised in particular scholarly contexts. Themes covered include paradigms, politics, people, aesthetics and technology. Original interpretative essays

set the literature into intellectual context within these themes. Excerpts are drawn from leading scholars and researchers in a range of cognate fields including: Cartography, Geography, Anthropology, Architecture, Engineering, Computer Science and Graphic Design. The Map Reader provides a new unique single source reference to the essential literature in the cartographic field: more than fifty specially edited excerpts from key, classic articles and monographs critical introductions by experienced experts in the field focused coverage of key mapping practices, techniques and ideas a valuable resource suited to a broad spectrum of researchers and students working in cartography and GIScience, geography, the social sciences, media studies, and visual arts full page colour illustrations of significant maps as provocative visual 'think-pieces' fully indexed, clearly structured and accessible ways into a fast changing field of cartographic research

As political, economic, and environmental issues increasingly spread across the globe, the science of geography is being rediscovered by scientists, policymakers, and educators alike. Geography has been made a core subject in U.S. schools, and scientists from a variety of disciplines are using analytical tools originally developed by geographers. Rediscovering Geography presents a broad overview of geography's renewed importance in a changing world. Through discussions and highlighted case studies, this book illustrates geography's impact on international trade, environmental change, population growth, information infrastructure, the condition of cities, the spread of AIDS, and much more. The committee examines some of the more significant tools for data collection, storage, analysis, and display, with examples of major contributions made by geographers. Rediscovering Geography provides a blueprint for the future of the discipline, recommending how to strengthen its intellectual and institutional foundation and meet the demand for geographic expertise among professionals and the public.

This is a hands-on book about ArcGIS that you work with as much as read. By the end, using Learn ArcGIS lessons, you'll be able to say you made a story map, conducted geographic analysis, edited geographic data, worked in a 3D web scene, built a 3D model of Venice, and more.

This text describes late-1990s understanding of map generalisation in the context of paper maps and GIS. Its particular value should be in helping to further automate and measure the process of map generalisation.; The research has concentrated on quantifying generalisation effects and on analysing how these effects of generalisation locked into the maps were measured. Elsa Joao's book covers the background to the problems of map generalisation; the methodology developed by the author to investigate the consequences of the map generalisation; a detailed description of results, and a conclusion that draws together consequences for the broader applications to GIS.

In these essays the author draws on ideas in art history, literature, philosophy and the study of visual culture to subvert

the traditional 'positivist' model of cartography and replace it with one grounded in an iconological and semiotic theory of the nature of maps.

Addressed to professional cartographers interested in moving into multimedia mapping, as well as those already involved in this field who wish to discover the approaches that other practitioners have already taken, this book/CD package is equally useful for students and academics in the mapping sciences and related geographic fields wishing to update their knowledge of cartographic design and production.

The contributors to this edited collection demonstrate that geographic information research is truly global in character, cutting across a wide range of disciplines and addressing conceptual, methodological, technical, ethical and political issues alike. Of the six themes, two are broadly concerned with data integration (geographic data infrastructures, GIS diffusion and implementation); two are more technical and conceptual in nature (generalisation, concepts and paradigms), and two reflect to a larger extent the application-driven nature of GIS technology (spatial analysis and multimedia). Each section is introduced by chapters highlighting the key research issues. Further chapters explore these issues in greater depth, and benefit from the international collaboration. Through the comparison of results included in this book, the prospects for advancing the field and addressing the challenges of GIS research are greatly improved. Visualization in Modern Cartography explores links between the centuries-old discipline of cartography and today's revolutionary developments in scientific visualization. The book has three main goals: (1) to pass on design and symbolization expertise to the scientific visualization community - information that comes from centuries of pre-computer visualization by cartographers, and their more recent experiences with computerizing the discipline; (2) to help cartographers cope with the dramatic shift from print cartography to a dynamic virtual cartography for which their role is changing from that of map designer to one of spatial information display (and/or interface) designer; (3) to illustrate the expanded role for cartography in geographic, environmental, planning, and earth science applications that comes with the development of interactive geographic visualization tools. To achieve these goals, the book is divided into three parts. The first sets the historical, cognitive, and technological context for geographic/cartographic visualization tool development. The second covers key technological, symbolization, and user interface issues. The third provides a detailed look at selected prototype geographic/cartographic visualization tools and their applications.

Computer science provides a powerful tool that was virtually unknown three generations ago. Some of the classical fields of knowledge are geodesy (surveying), cartography, and geography. Electronics have revolutionized geodetic methods. Cartography has faced the dominance of the computer that results in simplified cartographic products. All three fields make use of basic components such as the Internet and databases. The Springer Handbook of Geographic Information

is organized in three parts, Basics, Geographic Information and Applications. Some parts of the basics belong to the larger field of computer science. However, the reader gets a comprehensive view on geographic information because the topics selected from computer science have a close relation to geographic information. The Springer Handbook of Geographic Information is written for scientists at universities and industry as well as advanced and PhD students. Web mapping technologies continue to evolve at an incredible pace. Technology is but one facet of web map creation, however. Map design, aesthetics, and user-interactivity are equally important for effective map communication. From interactivity to graphical user interface design, from symbolization choices to animation, and from layout to typeface and color selection, Web Cartography offers the first comprehensive overview and guide for designing beautiful and effective web maps for a variety of devices. Written for those with a basic understanding of mapmaking, but who may not have an in-depth knowledge of web design, this book explains how to create effective interaction, animation, and layouts for maps in online and mobile platforms. Concept-driven, this reference emphasizes cartographic principles for web and mobile map design over specific software techniques. It focuses on key design concepts that will remain true regardless of software technologies used. The book is supplemented with a website providing links to stellar web maps, video tutorials and lectures, do-it-yourself labs, map critique exercises, and links to others' tutorials. Approachable, clear, and concise, the book provides a nontechnical, approachable guide to map design for the web. It provides best practices for map communication, based on spatial data visualization and graphic design theory. By carefully avoiding overly technical jargon, it provides a solid launching pad from which students, practitioners, and innovators can begin to design aesthetically pleasing and intuitive web maps.

This textbook examines the choices considered when creating geographic representations and cartographic representations, transforming spherical coordinates to planar coordinates, and modeling geographic data. Harvey (geography, University of Minnesota) introduces the three generic options for recording the locations and characteristics of things and events, the principles of remote sensing, map design elements, and geostatistical methods. Fifteen color plates are provided in the middle of the book, while black and white images are scattered throughout.

V.1 Foundational essays -- V.2 Critical Texts -- V.3 Disciplinary texts: Humanities and social sciences -- V.4 Legal studies, psychoanalytic studies, visual arts and architecture.

Maps are changing. They have become important and fashionable once more. Rethinking Maps brings together leading researchers to explore how maps are being rethought, made and used, and what these changes mean for working cartographers, applied mapping research, and cartographic scholarship. It offers a contemporary assessment of the diverse forms that mapping now takes and, drawing upon a number of theoretic perspectives and disciplines, provides an insightful commentary on new ontological and epistemological thinking with respect to cartography. This book presents a diverse set of approaches to a wide range of map forms and activities in what is presently a rapidly changing field. It employs a multi-disciplinary approach to important contemporary mapping practices, with chapters written by leading

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theorists who have an international reputation for innovative thinking. Much of the new research around mapping is emerging as critical dialogue between practice and theory and this book has chapters focused on intersections with play, race and cinema. Other chapters discuss cartographic representation, sustainable mapping and visual geographies. It also considers how alternative models of map creation and use such as open-source mappings and map mash-up are being creatively explored by programmers, artists and activists. There is also an examination of the work of various 'everyday mappers' in diverse social and cultural contexts. This blend of conceptual chapters and theoretically directed case studies provides an excellent resource suited to a broad spectrum of researchers, advanced undergraduate and postgraduate students in human geography, GIScience and cartography, visual anthropology, media studies, graphic design and computer graphics. Rethinking Maps is a necessary and significant text for all those studying or having an interest in cartography.

A concise text presenting the fundamental concepts in Geographical Information Systems (GIS), emphasising an understanding of techniques in management, analysis and graphic display of spatial information. Divided into five parts - the first part reviews the development and application of GIS, followed by a summary of the characteristics and representation of geographical information. It concludes with an overview of the functions provided by typical GIS systems. Part Two introduces co-ordinate systems and map projections, describes methods for digitising map data and gives an overview of remote sensing. Part Three deals with data storage and database management, as well as specialised techniques for accessing spatial data. Spatial modelling and analytical techniques for decision making form the subject of Part Four, while the final part is concerned with graphical representation, emphasising issues of graphics technology, cartographic design and map generalisation.

Making maps dates back at least four thousand years and it is widely recognised that many maps are of great historical value and present a skilled method of summarising the real world on a sheet of paper. Less well known is the judgement involved in the selection and simplification of features, the complex transformation of space and the exacting standards which are needed in cartography. This book is primarily a tribute to Professor F.J. Ormeling, former President and Secretary/Treasurer of the ICA and gives a wide ranging review of the current status of cartography, how this status was attained and the way in which the subject is expected to evolve over the next decade. It is composed of two main sections. In the first, the present state of cartography in different countries is examined. The second section is a thematic view in which some of the major issues and developments in cartography are discussed in turn, including art and science in cartography, the character of historical cartography, the role of map making in developing countries, the impact of a possible ideal computer mapping facility and how cartography has changed in recent years. There are international contributions from authors distinguished and internationally recognised in cartography and related fields and who have had a significant input to the ICA.

For generations, the map has been central to how societies function all over the world. Cybercartography is a new paradigm for maps and mapping in the information era. Defined as "the organization, presentation, analysis and communication of spatially referenced information on a wide variety of topics of interest to society, cybercartography is presented in an interactive, dynamic, multisensory format with the use of multimedia and multimodal interfaces. Cybercartography: Theory and Practice examines the major elements of cybercartography and emphasizes the importance of interaction between theory and practice in developing a paradigm which moves beyond the concept of Geographic Information Systems and Geographical Information Science. It argues for the centrality of the map as part of an integrated information, communication, and analytical package. This volume is a result of a multidisciplinary team effort and has benefited from the input of partners from government, industry and other organizations. The international team reports on major original cybercartographic research

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and practice from a variety of disciplinary perspectives, including the humanities, social sciences including human factors psychology, cybernetics, English literature, cultural mediation, cartography, and geography. This new synthesis has intrinsic value for industries, the general public, and the relationships between mapping and the development of user-centered multimedia interfaces. * Discusses the centrality of the map and its importance in the information era * Provides an interdisciplinary approach with contributions from psychology, music, and language and literature * Describes qualitative and quantitative aspects of cybercartography and the importance of societal context in the interaction between theory and practice * Contains an interactive CD-Rom containing color images, links to websites, plus other important information to capture the dynamic and interactive elements of cybercartography

Having the ability to measure and explore the geographic space that surrounds us provides endless opportunities for us to utilize and interact with the world. As a broad field of study, geospatial research has applications in a variety of fields including military science, environmental science, civil engineering, and space exploration. Geospatial Research: Concepts, Methodologies, Tools, and Applications is a multi-volume publication highlighting critical topics related to geospatial analysis, geographic information systems, and geospatial technologies. Exploring multidisciplinary applications of geographic information systems and technologies in addition to the latest trends and developments in the field, this publication is ideal for academic and government library inclusion, as well as for reference by data scientists, engineers, government agencies, researchers, and graduate-level students in GIS programs.

Applied Geography offers an invaluable introduction to useful research in physical, environmental and human geography and provides a new focus and reference point for investigating and understanding problem-orientated research. Forty-nine leading experts in the field introduce and explore research which crosses the traditional boundary between physical and human geography. A wide range of key issues and contemporary debates are within the books main sections, which cover: natural and environmental hazards environmental change and management challenges of the human environment techniques of spatial analysis Applied geography is the application of geographic knowledge and skills to identify the nature and causes of social, economic and environmental problems and inform policies which lead to their resolution. Digital practices in social and political landscapes: Why two researchers can look at the same feature and see different things. Maps are widely believed to be objective, and data-rich computer-made maps are iconic examples of digital knowledge. It is often claimed that digital maps, and rational boundaries, can solve political conflict. But in Mapping Israel, Mapping Palestine, Jess Bier challenges the view that digital maps are universal and value-free. She examines the ways that maps are made in Palestine and Israel to show how social and political landscapes shape the practice of science and technology. How can two scientific cartographers look at the same geographic feature and see fundamentally different things? In part, Bier argues, because knowledge about the Israeli military occupation is shaped by the occupation itself. Ongoing injustices—including checkpoints, roadblocks, and summary arrests—mean that Palestinian and Israeli cartographers have different experiences of the landscape. Palestinian forms of empirical knowledge, including maps, continue to be discounted. Bier examines three representative cases of population, governance, and

urban maps. She analyzes Israeli population maps from 1967 to 1995, when Palestinian areas were left blank; Palestinian state maps of the late 1990s and early 2000s, which were influenced by Israeli raids on Palestinian offices and the legacy of British colonial maps; and urban maps after the Second Intifada, which show how segregated observers produce dramatically different maps of the same area. The geographic production of knowledge, including what and who are considered scientifically legitimate, can change across space and time. Bier argues that greater attention to these changes, and to related issues of power, will open up more heterogeneous ways of engaging with the world.

This is an examination of the history and the state of the art of the quest for visualizing scientific knowledge and the dynamics of its development. Through an interdisciplinary perspective this book presents profound visions, pivotal advances, and insightful contributions made by generations of researchers and professionals, which portrays a holistic view of the underlying principles and mechanisms of the development of science. This updated and extended second edition: highlights the latest advances in mapping scientific frontiers examines the foundations of strategies, principles, and design patterns provides an integrated and holistic account of major developments across disciplinary boundaries “Anyone who tries to follow the exponential growth of the literature on citation analysis and scientometrics knows how difficult it is to keep pace. Chaomei Chen has identified the significant methods and applications in visual graphics and made them clear to the uninitiated. Derek Price would have loved this book which not only pays homage to him but also to the key players in information science and a wide variety of others in the sociology and history of science.” – Eugene Garfield “This is a wide ranging book on information visualization, with a specific focus on science mapping. Science mapping is still in its infancy and many intellectual challenges remain to be investigated and many of which are outlined in the final chapter. In this new edition Chaomei Chen has provided an essential text, useful both as a primer for new entrants and as a comprehensive overview of recent developments for the seasoned practitioner.” – Henry Small Chaomei Chen is a Professor in the College of Information Science and Technology at Drexel University, Philadelphia, USA, and a ChangJiang Scholar at Dalian University of Technology, Dalian, China. He is the Editor-in-Chief of Information Visualization and the author of *Turning Points: The Nature of Creativity* (Springer, 2012) and *Information Visualization: Beyond the Horizon* (Springer, 2004, 2006).

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