

Book Reviews

Geospatial Analysis: A Comprehensive Guide to Principles, Techniques, and Software Tools, Second Edition by MICHAEL J. DE SMITH, MICHAEL F. GOODCHILD, and PAUL A. LONGLEY. Available at <http://www.spatialanalysisonline.com/>

Geospatial Analysis is a welcome addition to the resources available to teachers, students, and practitioners of Geographic Information Science (GISc), not least because of the option to access the material online and free of charge. It is also available in two other formats, PDF and in print. In addition, the book is supported by supplementary materials such as Educational Resources, Software Tools, Blogs, and Quick Links to Geospatial Terminology, Case Studies, Data Sources, and Association and Trade sites, which are also available on the website <http://www.spatialanalysisonline.com>.

The book consists of eight sections: Introduction and Terminology, Conceptual Frameworks for Spatial Analysis, Historical and Methodological Context, Building Blocks of Spatial Analysis, Data Exploration and Spatial Statistics, Surface and Field Analysis, Network and Location Analysis, and Geocomputational Methods and Modeling. In the first section, the authors claim that this book is a “first port of call” for spatial analysis. Certainly it is an important port of call and the book can easily be recommended as a companion guide for anyone using GIS and spatial analysis, regardless of skill level and disciplinary focus. Before addressing specific analytical techniques, the authors use the first several sections to set a working definition of geospatial analysis that will be useful to a wide variety of readers. They then stress the importance of considering the appropriateness of tools (software and techniques) for a specific purpose, which can be challenging given the variety of “analysis” suites of options in GIS software. This book acts as a guide to the selection of appropriate tools for one’s geospatial analysis needs. The authors also discuss the importance of visualization in the discussion of geospatial analysis and acknowledge the contribution of visualization to analysis. Indeed, this introductory material frames the subject of geospatial analysis with multidisciplinary appeal as claimed and the majority of the book maintains a focus on common ground for public and private sector GIS applications, as well as for researchers.

Geospatial Analysis has several strengths that make it suitable for students, teachers, and a variety of practitioners: accessibility, multi-disciplinary applicability, concern with appropriateness of techniques, linked references, and online supporting materials. Online access to the supplementary materials and the free version of the book make it an ideal text for many students on a budget as well as a resource for GISc courses taught through distance education. Furthermore, the material is presented in a multidisciplinary frame so that regardless of the reader’s specialty, the book maintains its utility. In addition, the authors plainly state their goal of providing information on GIS and geospatial analysis without bias to software packages. This is a refreshing change. In

many texts with a software preference, students learn “button-pushing” in order to accomplish an analytical technique, but not the underlying principles and concepts that support what it is they are actually doing. *Geospatial Analysis* is an invaluable reference for this reason alone. In addition, throughout the text, the authors reference back to previously covered material. These references keep concepts and applications linked throughout the book. Linked references to publisher websites or Amazon are also provided so that the reader may further investigate in more detail topics of interest.

The Online Supporting Materials contain sections such as Educational Resources, Software Tools, Blogs, Case Studies, and Quick Links to topics such as Geospatial Terminology, Data Sources, and Lists of Associations and Trade Sites. The Educational Resources are comprised of PowerPoint slides, datasets and spreadsheets, which are useful supplemental resources to an instructor’s existing lectures. In the Software Tools section, the authors differentiate between free and proprietary resources and include lists of these tools along with links to their respective websites. Again, providing additional resources enables the reader to use *Geospatial Analysis* as a guide to materials tailored to his/her interests or needs. A Quick Links section consists of information on topics such as Geospatial Terminology, Notation and Symbology, Data Sources, and Lists of Associations and Trade Sites. Though not comprehensive, Geospatial Terminology does assist with definitions of basic terms. The Notation and Symbology material is particularly useful for students as it provides a quick reference for statistical measures and related formulas. A brief Data Sources section links to several US- and UK-based agencies. These materials are then followed by Lists of Associations and Trade Sites which serve as resources for students to investigate the breadth of users and uses of GIS and geospatial analysis. However, Trade Sites could also be used as a way to provide case studies through the articles available in periodicals such as *Directions Magazine*. Finally, the last Quick Link is termed a Useful Link from UTD (University of Texas at Dallas), which is a comprehensive reference for students and expert users alike. It provides a catalog for references to data, jobs, software, and other resources. However, other useful sites might be considered for addition, such as the website from the University of Arkansas “Starting the hunt: The guide to mostly online and mostly free U.S. geospatial and attribute data” (see <http://libinfo.uark.edu/gis/us.asp> for additional details).

Geospatial Analysis is a notable improvement to the available material on GIS and geospatial analysis. However, there are also a couple of areas where improvement would be useful, specifically consistent inclusion of images and examples and better integration of Case Studies. Discussion of many of the concepts included in this book would be enhanced by an image to provide visual illustration. In some cases images are included, such as in subsections on neighborhoods and topology, however, their use is inconsistent. In addition, real world examples of these concepts and techniques in action would be a useful component. For example, in subsections on Metadata and Interoperability there is certainly more room to discuss their importance. Some examples of where interoperability is problematic would be helpful. Use of an example would also improve the section on the Problem, Plan, Data, Analysis, and Conclusions (PPDAC) model for geospatial analysis. For many students, a worked case of this model in a real world GIS problem would be beneficial. Finally, the authors do mention that use of GIS and spatial analysis has ethical considerations, but little more is written about these concerns. There is certainly room for some discussion of this topic, again, with examples or with more links to resources that focus specifically on ethics in GIS.

The second area where improvements could be made is the Case Studies. These resources are presented as links to websites, which make for ease in accessibility, but also require reliance that the respective groups will maintain their sites. For example,

when selecting the first case study, Noise Mapping, the link leads to a message that this project has been decommissioned and then provides another link which takes the user to a page with a static noise map of London. This leaves the reader asking how is this a case study? In addition, the example of visualizing London air quality in three dimensions is interesting, but how does it relate to concepts/applications discussed in the guide? It would be helpful to point out specific techniques from Geospatial Analysis that are applied in these Case Studies. A suggestion to improve this section and provide examples to concepts, applications, and techniques is to link to articles from an online and freely accessible journal (such as the *International Journal of Health Geographics*) for specific examples tied to specific geospatial applications discussed in the book.

Overall, this book is an excellent resource for teachers, students, and practitioners. It is easily accessible, covers a breadth of topics, and provides links for the reader to investigate issues of interest in more detail. Geospatial Analysis is a notable step toward improving accessibility to the power of GIS and spatial analysis.

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Local Models for Spatial Analysis by CHRISTOPHER D. LLOYD. CRC Press, Boca Raton, Florida, 2007. 226pp. ISBN 0-415-31681-2, \$74.95 (soft cover).

This timely book addresses a topic of interest both to those who specialize in spatial analysis, as well as to those in applied domains who might benefit from the application of spatial statistical techniques. As the author notes, there is a growing interest in 'local' forms of spatial analysis, which the author defines broadly as quantitative analytical methods that incorporate location-specific information in some manner. There is certainly a widening recognition across the social and health sciences that 'place' matters, and thus a strong need for statistical techniques that are able to explicitly incorporate characteristics of location and spatial relationships. This book makes a solid contribution to furthering the use of such techniques by describing a wide array of local statistical techniques within a single volume.

The book is tightly organized, with the first two chapters devoted to introductory material, five middle chapters devoted to various categories of local spatial analysis, and a final chapter which summarizes the previously presented material. There are, of course, many logical ways one could categorize all the statistical techniques presented in the book. The author uses two approaches for this purpose: techniques designed to work with a specific type of data (e.g. grid data, point data) and techniques designed to meet a certain analytical purpose (e.g. interpolation). This approach works well, and the chapters are well-focused, with the presentation of material generally building upon itself throughout each chapter. The body of text is broken down extensively into subsections that are typically on the order of a page or two, and often even shorter. This staccato pace breaks the material into easily digestible chunks, while also allowing the author to cover a lot of ground, so that many specific techniques and their variations are covered within each chapter. The writing is clear and concise, typically getting quickly to the specifics of each technique.

Chapter 1 describes the fundamental principles of spatial analysis, including concepts such as spatial scale, spatial autocorrelation, and spatial nonstationarity. The chapter