

Computing in Geographic Information Systems

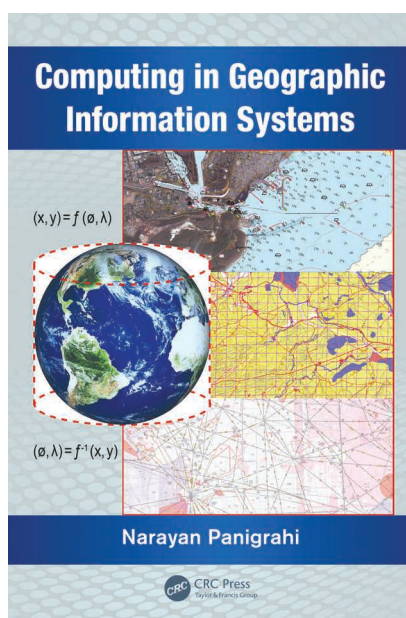
Reviewed by Dhruva Ghai

Recently, geographic information systems (GISs) have received much attention for applications in smart cities, accomplishing tasks including determining how much solar radiation reaches a given rooftop, asset management for property owners, disaster (rainwater) management, and location services, such as calculating drive/walk times to facilities for citizens. While related books teach how to apply GISs using software, *Computing in Geographic Information Systems* covers the underlying principles and algorithms used for developing GIS functions. The book consists of 12 chapters, with a summary at the end of each chapter to recapitulate the concepts.

Chapter 1 introduces GISs through definitions. It outlines various computational aspects and computing algorithms used in GISs. Chapter 2 gives a pedagogical definition of geodesy, mathematical models of Earth, and geometry of ellipse and ellipsoid, listing popular applications of geodesy.

In chapter 3, the author describes various Earth reference systems and coordinate systems. The differences among geodetic datum, coordinate systems, and map projections are explained in a lucid manner.

The book is an excellent source for map projections and their applications,



as explained in chapter 4. The sources of geometric distortion in aerial images, in general, and satellite images, in particular, are explained in chapter 5. This chapter is a good resource for image registration algorithms.

The focus of chapters 6 and 7 is on the geometric computations used in GISs. Geometric computational techniques, such as triangulation of simple polygons and computation of convex hulls of spatial locations in two dimensions, are explained with applications.

Chapter 8 provides materials on spatial interpolation techniques and nonegeostatistical interpolations used

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in the analysis of spatial data. Chapter 9 elucidates statistics, followed by its role in the analysis of spatial data. The descriptive statistical methods and inferential statistics used in the point pattern analysis explaining spatiotemporal situation are presented.

The spatial analyses of bathymetric data and sea GIS functions are explained in chapters 10 and 11, respectively. Chapter 12 concludes with some popular measurements and analyses used in GISs.

Overall, I am confident that this book is a very good source of reading for engineers as well as graduate and undergraduate students.

ABOUT THE REVIEWER

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