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# Book review: Applications of geospatial technology

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## APPLICATIONS OF GEOSPATIAL TECHNOLOGY

**Applications of Geospatial Technology.** Ganesh, A. (ed.), Satish Serial Publishing House, Delhi (2006). 297pp., diagrams, maps, photos, images, tables, index. Hardback. ISBN-81- 89304-25-9. Rs1295 (c.US\$32).

Ganesh, who edited this book, is a renowned researcher in the field of water resource evaluation and management. In this addition to his extensive collection of publications during the two decades of his academic career he contributes six chapters mainly related to applications of GIS in hydrological studies and data modelling. While the book covers a wide range of topics including principles, techniques, data, and diverse applications of Geographic Information Systems (GIS), the reader can particularly benefit from the hydrological focus of its applications.

River catchments worldwide are being overused and improperly managed to a large extent. Summarizing the prevailing world water crises, the UN's *World Water Development Report* (2003) states that the water crisis lies at the heart of the survival of all human beings and that of our planet earth. Catchment hydrology broadly describes the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere. Impacts of changed hydrology on biodiversity include deteriorating water quality, reduced water availability, altered flow regimes in waterways, and the rising of water tables due to clearing of native vegetation and the movement of salts to surface layers of soil and waterways.

The 20 chapters in the book can be organised into three main themes: Principles of geospatial technology, applications, and modelling with GIS. Each chapter is authored by an expert in the field. Tables, figures and references are included in each chapter. Most of the chapters end with a conclusion which helps readers to get an overview of the chapter. The index allows readers to find relevant topics quickly.

The book is particularly suitable for readers who want to explore the applicability of modern spatial information techniques in addressing catchment issues. As many hydrologists or ecologists are new to spatial information techniques, it is important to introduce the readers the principles, data and analytical tools of spatial information techniques. Even though these introductory topics are normally found in any of the introductory GIS text books, having dedicated some chapters to these themes, Ganesh is able to fulfil a necessary task by introducing the concepts to planners and resource managers. In line with this, in the first chapter, Ilangovan presents definitions of GIS, historical development, components, raster-vector representations of spatial features, data storage and GIS analysis functions. Each section is well supported by diagrams to help a novice understand the complex spatial data handling procedures. The second chapter, on GIS and its applications not only covers similar GIS concepts as in the first chapter but also elaborates on GIS database design, modelling and other application areas.

It is ideal to talk about geo-statistical interpolation techniques in Chapter 4 after a discussion of digital terrain models in Chapter 3. Map overlay analysis is the heart of the GIS data analysis which creates a new set of information based on Boolean logic. Chapter 5 gives a brief introduction to overlay analysis and then demonstrates how the overlay technique works using a case study. The case study will be particularly suitable for a person who has an interest in modelling water potentials using GIS. However, it would have been better to give more details and diagrammatic information on Boolean set theory operations as there are other overlay techniques available other than the logical union operation discussed in this chapter. Chapters 6 to 8 are devoted to applications of GIS in wasteland development, watershed delineation, and hydrological analysis. Topology is one of the important concepts generally found in GIS and topological relationships help improve the efficiency of vector-based GIS. Topology enables users to query spatial databases and support decision processes. Chapter 9 gives a brief introduction to topology. However, I feel that the concept of topology should have been described along with some examples to

show how it is being created at node, arc and polygon levels. I found the applications and case studies are more interesting. As the book is primarily devoted to applications of geospatial technology, it would have been more helpful to readers if there were case studies provided in Chapters 12 (Market and competitive intelligence), 16 (Crime modelling and GIS), and 17 (Role of GIS in combating crimes). Chapters 18 and 19 are devoted to the principles of Global Positioning Systems (GPS) and integration of GPS and GIS. Both these chapters make an important contribution to the text as GPS contributes tremendously to GIS as well as remote sensing. Chapter 18 gives the reader an introduction to GPS technology along with its historical development, components, applications and data acquisition. Current GIS software developments allow user to acquire accurate GPS readings directly in GIS databases and produce maps. Chapter 19 provides a thorough theoretical background on conversion procedures for GPS data in GIS systems. Chapter 20 gives an example to show how this integration produces accurate internet-based GIS maps for Bharathidasan University.

I believe that Ganesh accomplished the objectives of the book. The chapters cover a wide range of geospatial concepts and applications while the main focus has been the hydrological applications. This book is a suitable for anyone who is exploring ways of using geospatial data and techniques in a variety of different application areas. However, I would like to see more case studies supported by citation of recent literature on the topics, and the addressing of some formatting and typographical issues, if a new edition is planned.

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