

BOOK REVIEW

Learning GIS Using Open Source Software: An Applied Guide for Geo-spatial Analysis

Kakoli Saha and Yngve K. Frøyen. New York: Routledge, 2022. 226 pp., figures, appendices, notes, references, and index. \$145 hardcover (ISBN 978-0367487454)

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LEARNING GIS USING Open Source Software: An Applied Guide for Geo-spatial Analysis is an excellent addition to the list of textbooks written in recent years in the area of GIS using open-source software. The lead author, Kakoli Saha, is a well-known researcher with 15 years of experience in the field of geography and has written several research papers with GIS applications in geography and planning. The co-author, Yngve Frøyen, is a Norwegian planner with three decades of research, teaching, and publications in the areas of physical planning and sustainable urban transportation. The book in particular offers knowledge on the tools and techniques in GIS, and how these methods can be applied to real-world projects in the areas of urban and regional planning on the Indian subcontinent using open-source software.

As its platform, *Learning GIS Using Open Source Software* employs QGIS, a free and open-source software that users can utilize for geographic information system-based analysis. It is often stated that “knowledge is power and should be utilized to unite humankind, bring prosperity and not divide and perpetuate inequality.” GIS software can be expensive, excluding most students and researchers from learning and applying GIS methods for solving geographic and location-based decision making. This is especially the case in the Global South. Thus, open-source GIS software makes the technology available to a larger section of the world’s population, making it more inclusive and diverse, and thereby providing South Asian researchers an opportunity to make informed spatial decisions. An important strength of this book is that it features an easy-to-understand format. The book opens by discussing the concept of a GIS task and then elaborates on data requirements and methodology, followed by a tutorial that allows the student to learn

how to operationalize the method in a real-world context. Each chapter closes with a concise summary and a list of references.

Learning GIS Using Open Source Software is divided into eleven chapters. Chapter one establishes the motivations underlying the volume and provides a foundation along the themes of “conceptual directions on GIS,” “open-source GIS,” and the “role of GIS in spatial analysis” with reference to the fields of planning and architecture. The second chapter delves into the concept of open-source software with a highlight on GIS, paying special attention to its relevance in the Indian context. The chapter further elaborates the notion of Quantum GIS or QGIS. Chapter three deals with the topic of spatial referencing of GIS data. A spatial reference system is the coordinate system used to store Earth coordinates and its association with the GIS data. The following chapter deals with the issue of representing the real world in a GIS database. Real-world features can be represented by points, lines, and polygons in two GIS data types: raster and vector. Raster data is any pixelated (or gridded) data where each pixel is associated with a specific geographical location representing continuous data. Further, vector data are utilized to represent features on the Earth’s surface using points, lines, and polygons representing discrete objects. In addition, the chapter discusses editing and topology in GIS.

Moving deeper into the volume, chapter five offers a historical overview of mapmaking in the Indian and global contexts. The authors elaborate on selected themes such as classification of maps, the role of topographical maps, and the importance of GIS relative to computer-aided design (CAD) in making maps, and the introduce the notion of Web Map Service and Open Street Maps. The sixth chapter addresses thematic maps and illustrates their importance in representing qualitative and quantitative maps. The succeeding chapter investigates the topic of database management system (DBMS), which is the underlying structure that stores data in the form of attribute tables. It further explains how utilizing tutorials helps the researcher understand types, functions, and relationships between tables. Additionally, chapter eight addresses the issue of terrain representation in a GIS data model and analyzes digital elevation models (DEM) and triangular irregular network (TIN). Subsequently, chapter nine discusses at great length the history of geospatial analysis in GIS and diligently explains geoprocessing tools and map overlay techniques. The penultimate and concluding chapters focus on the application of GIS for transportation planning. The authors exert considerable effort in their discussion of network analysis and the variety of tools such as optimal route calculation, shortest distance path, origin-destination cost matrix, and service facility location.

Overall, *Learning GIS Using Open Source Software* represents an excellent contribution to the GIS and open-source bodies of literature. It is a vital textbook for students and researchers in the areas of geography, planning, and cognate fields in social sciences. The only recommendation I would offer to the authors would be to provide more examples and tutorials from other social science disciplines such as environmental studies, sociology, political science, and economics. Nevertheless, I will keep this book in my collection of research methodology textbooks because it is easy to read and comprehend, containing engaging tutorials that help in understanding challenging concepts in GIS with focused emphasis on South Asia.