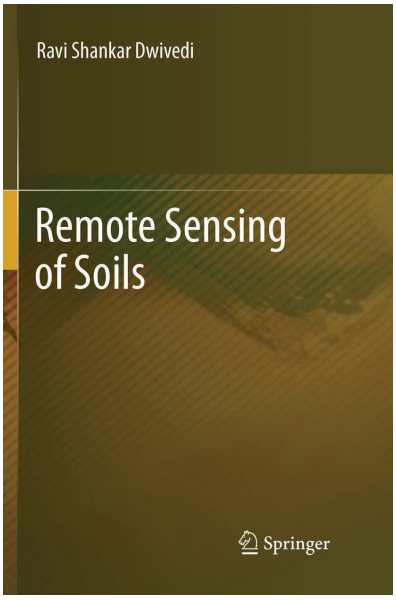

Remote Sensing of Soils

Ravi Shankar Dwivedi

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Reviewed by Pushkar P. Inamdar PhD, Data Scientist, Department of Epidemiology and Biostatistics, University of California San Francisco.

Remote Sensing of Soils by Ravi Shankar Dwivedi is a pivotal work that addresses the critical intersection of modern technology, environmental sustainability, and agricultural innovation. Dwivedi establishes the foundational understanding of remote sensing and its symbiotic relationship with technologies like Geographic Information Systems (GIS), Global Navigation Satellite Systems, and field data collection tools, which form the backbone of contemporary soil management strategies. This enables precise mapping, analysis, and interpretation of soil properties and conditions, essential for addressing global challenges such as food security, resource scarcity, and environmental degradation.

The book excels in two key areas: understanding soil composition and translating remote sensing data into actionable information. The author provides a concise overview of a wide array of airborne and spaceborne datasets, including multispectral, hyperspectral, lidar, and synthetic aperture radar (SAR). These datasets are integral for soil mapping, understanding soil texture and moisture content, and detecting erosion. The author also explores the intriguing science behind soil spectral reflectance patterns, showcasing how these patterns are crucial for deciphering soil properties. This knowledge is then applied to the intricacies of digital soil mapping, where the book highlights the challenges and opportunities in translating raw remote sensing data into actionable soil resource information beneficial for land management practices.

The author's discussion on digital image processing provides a valuable exploration of the techniques for processing spectral measurements from remote sensors. It explores the complexities of creating accurate landscape representations from remote sensing data and examines various image processing methods, including restoration, enhancement, and classification. It covers the Gaussian maximum likelihood classifier, a widely used technique in this field. *Remote Sensing of Soils* also encompasses topics commonly used in image analysis, including techniques like Principal Component Analysis (PCA), image fusion methods, Hierarchical Clustering, the application of Neural Networks in supervised satellite image classification, and object-oriented classifiers, among others. These topics are fundamental in extracting meaningful information from remote sensing data, enabling researchers and practitioners to enhance the accuracy and efficiency of soil mapping, vegetation analysis, and environmental monitoring. The book provides readers with the necessary tools for advanced image-processing tasks.

The later segments of the book examine advanced topics such as soil moisture estimation and soil fertility evaluation, both crucial in modern agriculture and sustainable practices. The author's exploration of remote sensing techniques for assessing these factors showcases the transformative potential of technology in optimizing crop growth and resource utilization.

What sets this book apart is its accessibility and relevance to a diverse audience. Whether one is a seasoned researcher, a technology developer, or a soil science student, Remote Sensing of Soils offers valuable insights and practical knowledge. The author's clear language and comprehensive references make complex concepts understandable and applicable in real-world scenarios.

Future editions of Remote Sensing of Soils might benefit from exploring the potential of machine learning and deep learning in precision agriculture through an introductory chapter. Additionally, showcasing specific applications of geospatial science with machine learning and deep learning techniques in areas like soil moisture estimation, fertility evaluation, and soil classification could further enhance the book's comprehensiveness and relevance for future advancements.

In essence, Remote Sensing of Soils is a valuable roadmap for leveraging advanced technologies like remote sensing, GIS, and geospatial analysis to address critical environmental and agricultural challenges. The book informs readers about the latest advancements and inspires them to explore innovative solutions for sustainable soil management and ecosystem preservation.

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