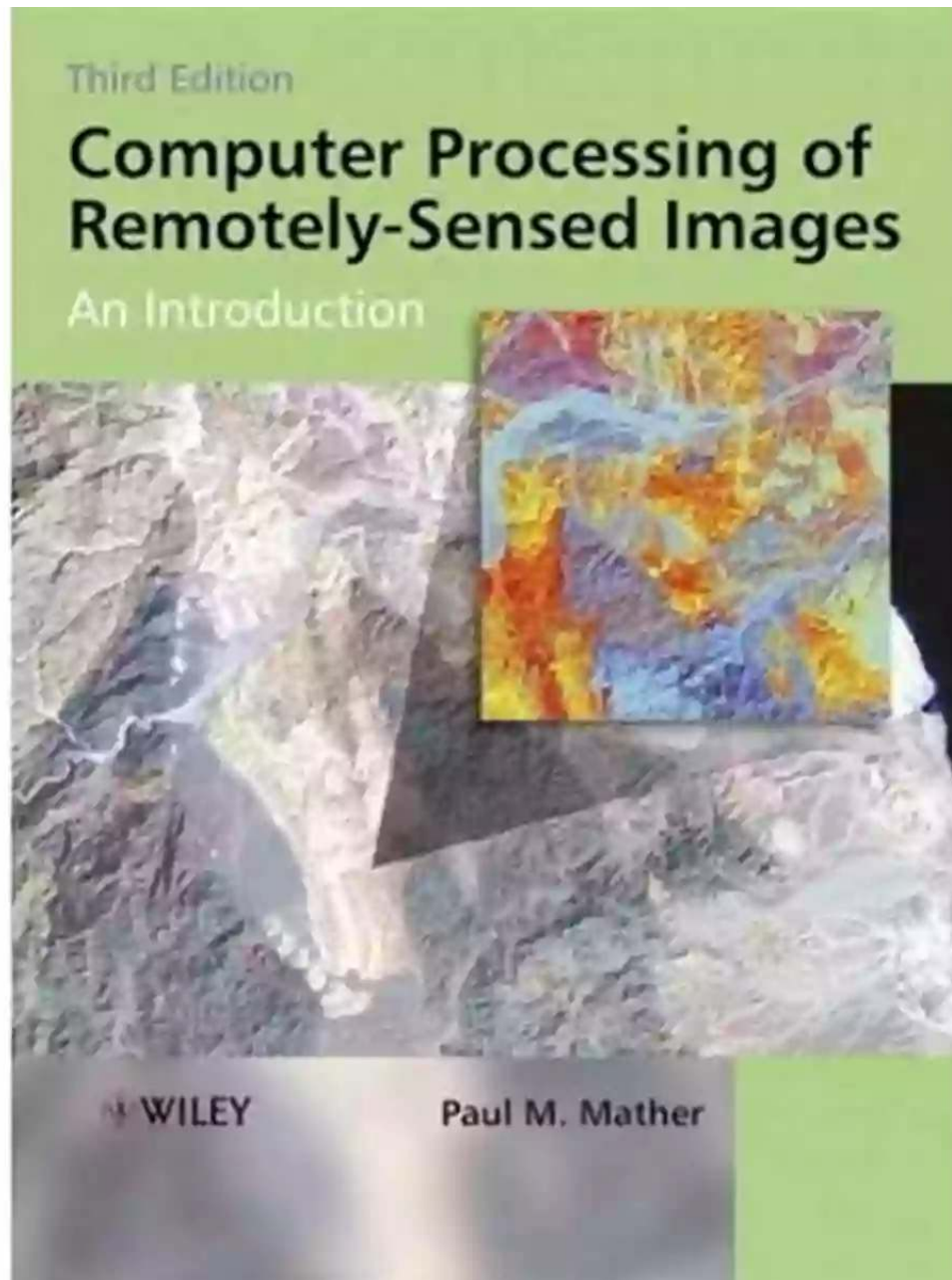


The Fascinating World of Computer Processing of Remotely Sensed Images

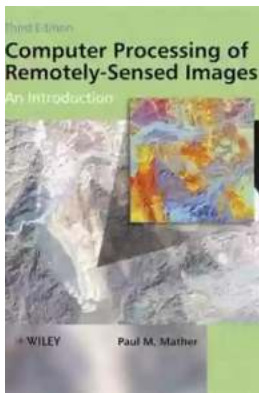


The ability to capture images of our planet from outer space using satellites revolutionized our understanding of Earth's surface and its processes. This incredible technology, known as remote sensing, has further advanced with the development of computer processing techniques. In this article, we will dive into

the world of computer processing of remotely sensed images and explore its fascinating applications and significance.

The Basics of Remote Sensing

Remote sensing refers to the collection of data about an object or phenomenon without being in physical contact with it. The process involves capturing electromagnetic radiation, such as visible light, infrared, or microwave signals, using sensors mounted on satellites or aircraft. These sensors record the radiation reflected or emitted by Earth's surface and atmosphere.



Computer Processing of Remotely-Sensed Images: An Introduction

by Paul M. Mather(4th Edition, Kindle Edition)

★★★★★ 5 out of 5

Language : English
File size : 14440 KB
Text-to-Speech : Enabled
Screen Reader : Supported
Enhanced typesetting : Enabled
Print length : 460 pages
Lending : Enabled



The captured data is then transformed into images and analyzed to gather valuable information about various components of Earth's land, water, and atmosphere. These images provide insights into vegetation growth, atmospheric conditions, land use patterns, natural disasters, and much more. Remote sensing plays a crucial role in fields such as environmental monitoring, agriculture, urban planning, and disaster management.

The Role of Computer Processing

The raw data collected by remote sensing sensors often needs to be enhanced and processed to extract meaningful information. This is where computer processing comes into play. With the advancement in computing power and image processing algorithms, remote sensing data can be transformed and analyzed effectively.

Computer processing techniques involve a series of steps, such as image restoration, image enhancement, image classification, and image interpretation. These steps help in improving visual quality, identifying features and patterns, and extracting quantitative information from remotely sensed images.

Applications of Computer Processing of Remotely Sensed Images

The applications of computer processing of remotely sensed images are wide-ranging and crucial for understanding our dynamic planet.

1. Environmental Monitoring

Remotely sensed images provide valuable information about land cover, vegetation health, and changes in ecosystems over time. By analyzing these images, scientists can monitor deforestation, track the growth of urbanization, assess the health of coral reefs, study glacier retreat, and evaluate the impact of climate change on various habitats. This helps in formulating effective conservation and management strategies.

2. Agriculture

Computer processing of remotely sensed images aids in agricultural crop monitoring, precision farming, and yield prediction. By analyzing vegetation indices and crop patterns, farmers and researchers can assess crop health, detect stress and diseases, optimize water and fertilizer usage, and plan effective

harvest periods. This enhances productivity, reduces costs, and promotes sustainable agriculture.

3. Disaster Management

During natural disasters such as floods, earthquakes, or wildfires, computer processing of remotely sensed images helps in disaster assessment and response planning. These images provide critical information about damage extent, affected areas, and infrastructure impacted. Emergency responders can utilize this data to prioritize rescue operations, allocate resources, and aid in recovery efforts.

4. Urban Planning

Remote sensing images processed through computer algorithms enable urban planners to analyze land use patterns and plan for efficient urban developments. By identifying areas of high population density, analyzing transportation networks, and assessing environmental conditions, cities can implement sustainable and resilient infrastructure, reduce traffic congestion, and improve overall quality of life.

Computer processing of remotely sensed images has revolutionized our ability to analyze and understand Earth's surface and its dynamics. From environmental monitoring to disaster management, this incredible technology empowers us with valuable insights and aids in making informed decisions to sustain and protect our planet for future generations.

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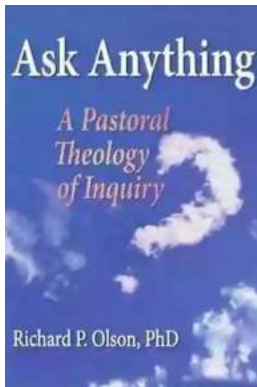
This fourth and full colour edition updates and expands a widely-used textbook aimed at advanced undergraduate and postgraduate students taking courses in remote sensing and GIS in Geography, Geology and Earth/Environmental Science departments. Existing material has been brought up to date and new material has been added. In particular, a new chapter, exploring the two-way links between remote sensing and environmental GIS, has been added.

New and updated material includes:

- A website at www.wiley.com/go/mather4 that provides access to an updated and expanded version of the MIPS image processing software for Microsoft Windows, PowerPoint slideshows of the figures from each chapter, and case studies, including full data sets,
- Includes new chapter on Remote Sensing and Environmental GIS that provides insights into the ways in which remotely-sensed data can be used synergistically with other spatial data sets, including hydrogeological and archaeological applications,
- New section on image processing from a computer science perspective presented in a non-technical way, including some remarks on statistics,

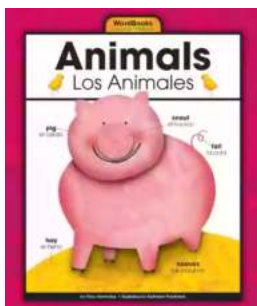
- New material on image transforms, including the analysis of temporal change and data fusion techniques,
- New material on image classification including decision trees, support vector machines and independent components analysis, and
- Now in full colour throughout.

This book provides the material required for a single semester course in Environmental Remote Sensing plus additional, more advanced, reading for students specialising in some aspect of the subject. It is written largely in non-technical language yet it provides insights into more advanced topics that some may consider too difficult for a non-mathematician to understand. The case studies available from the website are fully-documented research projects complete with original data sets. For readers who do not have access to commercial image processing software, MIPS provides a licence-free, intuitive and comprehensive alternative.



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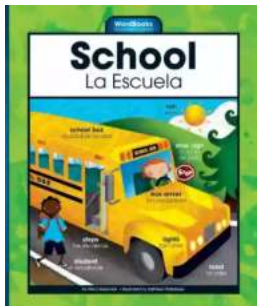
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