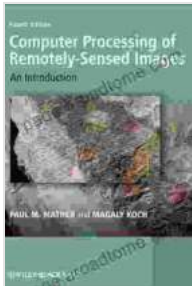# Unlocking the Secrets of Satellite Imagery: An Introduction to Computer Processing of Remotely Sensed Images

Computer Processing of Remotely-Sensed Images: An Introduction by Paul M. Mather

★★★★★ 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 advent of satellite technology has revolutionized our ability to observe and monitor the Earth's surface. Remote sensing satellites collect vast amounts of data in the form of images, which provide valuable insights into various aspects of our planet, including land cover, vegetation health, water quality, and urban development.

However, raw satellite images are not directly interpretable by humans. To extract meaningful information from these images, they must be processed using specialized computer techniques. This is where the field of computer processing of remotely sensed images comes into play.

What is Computer Processing of Remotely Sensed Images?

Computer processing of remotely sensed images is the process of using computational methods to analyze and interpret satellite images. It involves a range of techniques, including image enhancement, image classification, change detection, and hyperspectral image analysis, to extract valuable information from the vast amounts of data collected by remote sensing satellites.

Applications of Computer Processing of Remotely Sensed Images

Computer processing of remotely sensed images has a wide range of applications in various fields, including:

- **Land Cover Classification:** Identifying and mapping different types of land cover, such as forests, grasslands, and urban areas, using satellite images.

- **Vegetation Health Monitoring:** Assessing the health and productivity of vegetation by analyzing satellite images that capture vegetation indices, such as the Normalized Difference Vegetation Index (NDVI).

- **Water Quality Monitoring:** Monitoring the quality of water bodies, such as lakes and rivers, by analyzing satellite images that capture water color and turbidity.

- **Urban Development Monitoring:** Tracking the growth and expansion of urban areas by analyzing satellite images that capture changes in land cover and urban infrastructure.

Techniques in Computer Processing of Remotely Sensed Images

Computer processing of remotely sensed images involves a variety of techniques, each designed to extract specific types of information from

satellite images. Some of the most common techniques include:

- **Image Enhancement:** Enhancing the visual quality of satellite images to make them more interpretable by humans. Techniques such as contrast stretching and histogram equalization are used to improve the visibility of features in the images.

- **Image Classification:** Assigning pixels in a satellite image to different classes, such as land cover types or vegetation types. Supervised and unsupervised classification algorithms are used to train the computer to recognize and classify different features in the images.

- **Change Detection:** Identifying changes in satellite images over time. Techniques such as image differencing and post-classification comparison are used to detect changes in land cover, vegetation cover, or urban development.

- **Hyperspectral Image Analysis:** Analyzing satellite images that capture data across multiple bands of the electromagnetic spectrum. This technique is used to identify and distinguish different materials and objects based on their spectral signatures.

Computer processing of remotely sensed images is a powerful tool for extracting valuable information from satellite imagery. By harnessing the capabilities of modern computers, we can unlock the secrets of satellite images and gain a deeper understanding of our planet. This technology has revolutionized various fields and continues to play a critical role in monitoring and managing natural resources, environmental changes, and human activities.

Recommended Resources:

For more information on computer processing of remotely sensed images, I highly recommend the following resources:

- Computer Processing of Remotely Sensed Images - Natural Resources Canada

- Remote Sensing Specialization - Coursera

- Analyzing Remotely Sensed Data Using ArcGIS Pro - ESRI
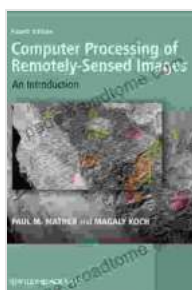
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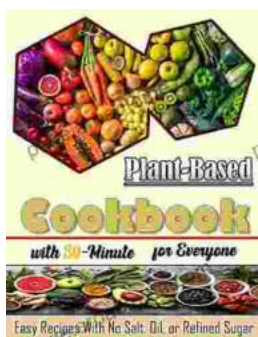
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