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Road Extraction from Satellite Images

Abstract

Satellite imagery plays a crucial role in various applications such as urban planning, environmental monitoring, and disaster management. Extracting roads from satellite images is a fundamental task for many of these applications. In this study, we propose a road extraction method based on the Maximum Entropy Thresholding technique in image processing.

The Maximum Entropy Thresholding method aims to find the optimal threshold that maximizes the entropy of the resulting binary image. By maximizing entropy, we ensure that the extracted roads retain as much discriminative information as possible while minimizing noise and irrelevant features.

To implement our method, we utilize MATLAB, a powerful tool for image processing and computer vision tasks. MATLAB provides efficient functions for image manipulation, thresholding, and segmentation, making it well-suited for our purpose.

In our approach, we start by pre-processing the satellite images to enhance contrast and reduce noise. Then, we apply the Maximum Entropy Thresholding technique to obtain a binary mask highlighting potential road pixels. Post-processing steps such as morphological operations are employed to refine the extracted roads and eliminate spurious detections.

We evaluate the performance of our method on various satellite images datasets, quantitatively assessing factors such as precision, recall, and F1-score. Our results demonstrate the effectiveness of the Maximum Entropy Thresholding approach in accurately extracting roads from satellite imagery, making it a valuable tool for remote sensing applications.

Software Requirements :MATLAB 2021a

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