Chapter 1

A Rank-Based Algorithm for Aggregating Land Cover Maps

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Abstract

A rank-based algorithm to aggregate land cover data to coarser resolutions with minimal change of information is presented. The method uses pixel spatial patterns in the fine resolution image to preferentially aggregate blocks that show homogeneity, majority and adjacency of the subpixels. Disappearance of classes is avoided by predefining the number of pixels of each class that should be present in the coarse resolution image. The rank-based aggregation algorithm is compared with majority aggregation and random aggregation algorithms. Using spatial pattern metrics quantifying class proportions and fragmentation, the rank-based aggregation method is shown to better conserve the information present in the original image relative to the other algorithms considered. Similarity metrics such as the Euclidean distance and the Czekanowski coefficient indicate that images aggregated by means of the rank-based aggregation algorithm are more similar to the original image than aggregation results from the other techniques. Rank-based aggregation is also shown to be associated with less unpredictability than its alternatives, and the number of blocks assigned to a minority class is found to be negligible.

Keywords: Rank-based aggregation algorithm; Map; Scale; Spatial pattern; Similarity; Class proportions; Fragmentation; Euclidean distance; Czekanowski coefficient; Accuracy; Unpredictability

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