

Dual Domain Near Neighbor Analysis of Landscape Pattern with Image Models

Wayne L. Myers, Ph.D.
Professor of Forest Biometrics
School of Forest Resources & Penn State Institutes of Environment
Land & Water Research Bldg.
Penn State University
University Park, PA 16802
wlm@psu.edu

Abstract: Progressively Segmented Image Modeling As Poly-Patterns (PSIMAPP) produces image-based landscape representations for investigation of multi-scale properties of patterns in landscapes. Decomposition of patterns across scales can be approached by successive generations of generalization for the pattern model. In so doing, the problem is to achieve a self-limiting process for suppression of detail that determines the scope of a generation while respecting both signal similarities and spatial structure. This can be accomplished by consolidation of segments that are nearest neighbors in the signal domain if they are also among k-neighbors in terms of proportional frequency for edge juxtaposition of cells (pixels) comprising the respective segments. The prototype version of the process uses single linkage in both the signal domain and the domain of spatial juxtaposition. Poly-pattern modeling of multi-band images for landscape analysis is presented, and generations of generalization for multi-scale representation of selected Pennsylvania landscapes are considered.