Automatic sorting of point pattern sets using Minkowski Functionals JOSHUA PARKER, Institute for Research in Electronics and Applied Physics, University of Maryland, EILON SHERMAN, National Cancer Institute, The National Institutes of Health, MATTHIAS VAN DE RAA, Institute for Nanotechnology, University of Twente, LARRY SAMELSON, National Cancer Institute, The National Institutes of Health, WOLFGANG LOSERT, Institute for Research in Electronics and Applied Physics, University of Maryland — Point patterns arise in many different areas of physical and applied research, often resulting in sets of patterns that may or may not be fundamenally different. We introduce here a automatable numerical taxonomy procedure for clustering point pattern sets using their approximated Minkowski functionals. We demonstrate that this procedure outperforms current methods, even when the patterns are drawn from very similar processes. We highlight the use of this routine for automatically analyzing sets of patterns, and in particular super-resolution images of fluorescently labeled proteins. Overall, we find that this routine is a robust method for sorting point pattern sets, and provides meaningful insight regarding the homogeneity of spatial processes.

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