
Mathematical morphology on a few discrete structures

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Abstract

Mathematical morphology, in its deterministic setting, is often defined on complete lattices. In this presentation, we will illustrate such definitions on several types of discrete frameworks, endowed with a lattice structure. A first example deals with fuzzy sets, defined on digital 2D or 3D images. From fuzzy mathematical morphology, spatial relations can be modeled, and used in model-based image understanding. To go further in the structure of a scene, graph and hypergraph representations can also benefit from mathematical morphology. At a more abstract level, we will show how morpho-logic, i.e. merging mathematical morphology with various logics, provides a sound reasoning framework, with applications to classical artificial intelligence tasks such as revision, fusion, abduction. Finally, we will show how mathematical morphology can be applied on concept lattices, with applications in image understanding and music representations.

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