

Mathematical Morphology, Lattices, and Formal Concept Analysis

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Abstract. Lattice theory has become a popular mathematical framework in different domains of information processing, and various communities employ its features and properties, e.g. in knowledge representation, in logics, automated reasoning and decision making, in image processing, in information retrieval, in soft computing, in formal concept analysis. Mathematical morphology is based adjunctions, on the algebraic framework of posets, and more specifically of complete lattices, which endows it with strong properties and allows for multiple applications and extensions. In this talk we will summarize the main concepts of mathematical morphology and show their instantiations in different settings, where a complete lattice can be built, such as sets, functions, partitions, fuzzy sets, bipolar fuzzy sets, formal logics . . . We will detail in particular the links between morphological operations and formal concept analysis, thus initiating links between two domains that were quite disconnected until now, which could therefore open new interesting perspectives.