

FCA, a Step From Lattice Theory to Efficient Pattern Mining Approaches

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Abstract

In this talk, I will retrace the main mathematical steps from lattice theory to current pattern mining approaches for complex data. I will first present a survey of lattice theory, from the algebraic definition of a lattice, to that of a concept lattice, through closure systems including the exploration of fundamental bijective links between lattices, reduced contexts and bases of implicational rules. The structure of lattice or “concept lattice” is highlighted in Formal Concept Analysis (FCA). This lattice, originally defined for binary or categorical data, has proved to be useful in many fields, e.g. artificial intelligence, knowledge management, data-mining, machine learning, etc. I will then present some recent extensions of FCA to deal with non binary and complex data in order to propose efficient pattern mining approaches.

Keywords

Formal Concept Analysis, Lattice Theory, Implications Bases, Pattern Mining

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