

1015-18-249

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We propose a mathematical model for structured data analysis, in terms of graph theory, with an exterior hierarchical extension of the simplest hierarchial structure, provided by 1-graph proses, to multigraph, and the specification of the interior structure (Aggregation of more detail) leads to graphs of graphs and multigraphs of multigraps. We present applications in Multiscale database MRDB,including a mathematical description for preciseness (several levels of details) and peculiarity (hierarchization of information); and data mining techniques to discover patterns consisting of complex relationships between entities, including processing and assimilation of periodic increments of new data and the scalability of graph-based discovery to monolithic datasets. (Received February 06, 2006)