

Labeled Graphs Rewriting Meets with Social Networks

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Abstract. The intense development of computing techniques and increasing volumes of produced data nowadays raise the need to model and analyse information that is: complex due to massive and highly heterogeneous data; distributed and connected in networks; dynamic due to interactions, time, external or internal evolutions. We argue in this work that relevant concepts to address these challenges are provided by three ingredients: labeled graphs to represent networks of data or objects; rewrite rules to deal with concurrent local transformations; strategies to express control versus autonomy and to focus on points of interests. To sustain the argumentation and illustrate the use of these concepts, we choose to focus our interest on social networks simulation and analysis, and more precisely on two phenomena: influence propagation and dynamic evolution. Labeled graph strategic rewriting then provides a common formalism in which different mathematical models can be expressed and compared. The ultimate goal is to provide a simulation environment helpful for taking decision, such as choosing good parameters, detecting and preventing unwanted situations, or looking for better diffusion strategy. Conversely, the study of social networks, with their size and complexity, stimulates the search for structuration and efficiency of graph rewriting. It also motivated new or more general kinds of graphs, rules and strategies (for instance to define positions in graphs) that are presented here. This opens the way to further theoretical and practical questions for the rewriting community.