Discovering Graph Temporal Association Rules

This paper presents a new method and rules for discovering temporal graphs. New rules called graph temporal association rules (GTAR) and these rules are optimized version of the association rules for the temporal graphs. The paper also consists of new discovering algorithm that uses GTAR. This algorithm has distinct efficiency methods to increase the discovery operation's performance. Last, the authors tested the new algorithm and GTAR performance with syntactic and real datasets.

Instead of using association rules on temporal graphs, they developed new rules with efficient techniques for temporal graphs. These rules have 2 extreme points but algorithm has balance between expressiveness and cost of graph discovery. Also, for increasing the overall efficiency and performance, the authors combined event mining and rule discovery processes. In addition to that, they used event pruning method to improve performance of the system even more. System tries to generate best LHS and RHS events. For this, it generates LSH and RHS event candidate sets and combines the best of them. Moreover, RHS spawn operation has optimization for LHS for higher efficiency while creating the candidate set. System also uses prioritization technique and using it could make calculations faster. In experiments, the authors used both real and syntactic data with different number of data. Experiments test 4 different scenarios (efficiency and scalability, efficiency of parameters, anytime performance, GTAR model effectiveness). Showing each parameters effect on the overall system is very important for the algorithm. Lastly, experiment results and performance graphs show that GTAR with pruning outperforms the similar GTAR methods without pruning.

The paper consists of lots of symbols and it makes it harder to read and understand. More and simpler examples would benefit the intelligibility of the paper. The authors use event pruning method on non-interesting events. However, they didn't mention what type of events are non-interesting to system or how system can determine if the events are interesting or not. Finally, the experiments only consist of GTAR algorithms. Thus, readers cannot decide if GTAR performs good or bad compared to similar temporal graph discovery algorithms.

As I mentioned in the weakness part, the paper and the examples should have been easier to read and understand. Also, the authors should have mentioned the event interestingness and should test similar algorithms to compare GTAR's performance. The current system coded with Java however, in the future they could use more performance friendly programming languages like C++. Besides, this paper doesn't have any Future Works part, and I think there should be one.

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