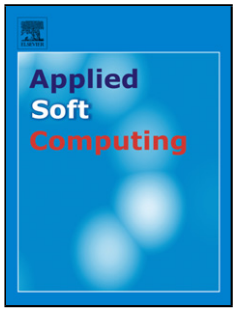


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# Mining Temporal Association Rules with Frequent Itemsets Tree

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The main highlights of this paper are as follows:

- The algorithm is presented to mine the multidimensional temporal association rules based on frequent itemsets tree, based on which, building the tree and mining the temporal relation between the frequent itemset proceed simultaneously, which provides better mining efficiency and interpretability.

**Abstract** A novel framework for mining temporal association rules by discovering itemsets with frequent itemsets tree is introduced. In order to solve the problem of handling time series by including temporal relation between the multi items into association rules, a frequent itemsets tree is constructed in parallel with mining frequent itemsets to improve the efficiency and interpretability of rule mining without generating candidate itemsets. Experimental results show that our algorithm can provide better efficiency and interpretability in mining temporal association rules in comparison with other algorithms and has good application prospects.

**Keywords**Temporal relationship, Frequent itemsets tree, Temporal association rule, Interpretability

## 1. Introduction

Temporal data mining is popular in recent years. It analyzes temporal data to get patterns or regularities. There are many techniques included in temporal data mining. Sequential association mining[1], cyclic association mining[2], stock trading rule mining[3], patent mining[4], clinical mining[5], image time series mining[6], software adoption and penetration mining[7], temporal utility mining[8], fuzzy temporal mining[9], and calendar association mining[10] all belong to it. Temporal association rules is a an interesting extension to association rules by including a temporal dimension, which leads to different forms of association rules with time. When an event leads to the occurrence of other events, there may be causal relationships or certain correlations between these events. In fact, temporal association rules can be looked as association rules with time constraints. The corresponding mining purpose is to find out the association between events and time in temporal transaction set, and the relationship between events based on the time domain in order to better reflect the association between data and time. For example, the meteorological field predicts air