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Monotone Constraints

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Synonyms

[Monotonic constraints](#)

Definition

A constraint C is *monotone* if and only if for all itemsets S and S' :

if $S \supseteq S'$ and S violates C , then S'
violates C .

Key Points

Monotone constraints [1–3] possess the following nice property. If an itemset S violates a monotone constraint C , then any of its subsets also violates C . Equivalently, all supersets of an itemset satisfying a monotone constraint C also satisfy C (i.e., C is upward closed). By exploiting this property, monotone constraints can be used for reducing computation in frequent itemset mining with constraints. As frequent itemset mining with

constraints aims to find frequent itemsets that satisfy the constraints, if an itemset S satisfies a monotone constraint C , no further constraint checking needs to be applied to any superset of S because all supersets of S are guaranteed to satisfy C . Examples of monotone constraints include $\min(S.Price) \leq \$30$, which expresses that the minimum price of all items in an itemset S is at most \$30. Note that, if the minimum price of all items in S is at most \$30, adding more items to S would not increase its minimum price (i.e., supersets of S would also satisfy such a monotone constraint).

Cross-References

► [Frequent Itemset Mining with Constraints](#)

Recommended Reading

1. Brin S, Motwani R, Silverstein C. Beyond market baskets: generalizing association rules to correlations. In: Proceedings ACM SIGMOD international conference on management of data. 1997. p. 265–76.
2. Grahne G, Lakshmanan LVS, Wang X. Efficient mining of constrained correlated sets. In: Proceedings of 16th international conference on data engineering. 2000. p. 512–21.
3. Pei J, Han J. Can we push more constraints into frequent pattern mining? In: Proceedings of 6th ACM SIGKDD international conference on knowledge discovery and data mining. 2000. p. 350–54.