

Book Title	Encyclopedia of Machine Learning	
Book CopyRight - Year	2010	
Title	Association Rule	
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Association Rule

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Definition

Association rules (Agrawal, Imieliński, & Swami, 1993) can be extracted from data sets where each example consists of a set of items. An association rule has the form $X \rightarrow Y$, where X and Y are [▶itemsets](#), and the interpretation is that if set X occurs in an example, then set Y is also likely to occur in the example.

Each association rule is usually associated with two statistics measured from the given data set. The *frequency* or *support* of a rule $X \rightarrow Y$, denoted $\text{fr}(X \rightarrow Y)$, is the number (or alternatively the relative frequency) of examples in which $X \cup Y$ occurs. Its *confidence*, in turn, is the observed conditional probability $P(Y | X) = \text{fr}(X \cup Y) / \text{fr}(X)$.

The [▶Apriori algorithm](#) (Agrawal, Mannila, Srikant, Toivonen & Verkamo, 1996) finds all association rules, between any sets X and Y , which exceed user-specified

support and confidence thresholds. In association rule mining, unlike in most other learning tasks, the result thus is a set of rules concerning different subsets of the feature space.

Association rules were originally motivated by supermarket [▶basket analysis](#), but as a domain independent technique they have found applications in numerous fields. Association rule mining is part of the larger field of [▶frequent itemset](#) or [▶frequent pattern mining](#).

Cross References

- ▶Apriori Algorithm
- ▶Basket Analysis
- ▶Frequent Itemset
- ▶Frequent Pattern

Recommended Reading

- Agrawal, R., Imieliński, T., & Swami, A. (1993). Mining association rules between sets of items in large databases. In *Proceedings of the 1993 ACM SIGMOD international conference on management of data, Washington, DC* (pp. 207–216). New York: ACM.
- Agrawal, R., Mannila, H., Srikant, R., Toivonen, H., & Verkamo, A. I. (1996). Fast discovery of association rules. In U. M. Fayyad, G. Piatetsky-Shapiro, P. Smyth, & R. Uthurusamy (Eds.), *Advances in knowledge discovery and data mining* (pp. 307–328). Menlo Park: AAAI Press.