

Title: Instance-based learning

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In machine learning , instance-based learning (sometimes called memory-based learning [1]) is a family of learning algorithms that, instead of performing explicit generalization, compare new problem instances with instances seen in training, which have been stored in memory. Because computation is postponed until a new instance is observed, these algorithms are sometimes referred to as "lazy." [2]

It is called instance-based because it constructs hypotheses directly from the training instances themselves. [3] This means that the hypothesis complexity can grow with the data: [3] in the worst case, a hypothesis is a list of n training items and the computational complexity of classifying a single new instance is $O(n)$. One advantage that instance-based learning has over other methods of machine learning is its ability to adapt its model to previously unseen data. Instance-based learners may simply store a new instance or throw an old instance away.

Examples of instance-based learning algorithms are the k -nearest neighbors algorithm , kernel machines and RBF networks . [2] : ch. 8 These store (a subset of) their training set; when predicting a value/class for a new instance, they compute distances or similarities between this instance and the training instances to make a decision.

To battle the memory complexity of storing all training instances, as well as the risk of overfitting to noise in the training set, instance reduction algorithms have been proposed. [4]

See also

Analogical modeling

References

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