Title: Relevance vector machine

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Categories: Category:Classification algorithms, Category:Kernel methods for machine learning, Category:Nonparametric Bayesian statistics

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Relevance vector machine (RVM)

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Bayes net

Conditional random field

Hidden Markov

RANSAC

k -NN

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Recurrent neural network LSTM GRU ESN reservoir computing

LSTM

GRU

ESN

reservoir computing

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Restricted

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Diffusion model

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U-Net

LeNet

AlexNet

DeepDream

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Neural radiance field

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AAAI

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ICML

ICLR

IJCAI

ML

JMLR

Glossary of artificial intelligence

List of datasets for machine-learning research List of datasets in computer vision and image processing

List of datasets in computer vision and image processing

Outline of machine learning

v

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e

In mathematics , a Relevance Vector Machine (RVM) is a machine learning technique that uses Bayesian inference to obtain parsimonious solutions for regression and probabilistic classification . [1] A greedy optimisation procedure and thus fast version were subsequently developed. [2] [3] The RVM has an identical functional form to the support vector machine , but provides probabilistic classification.

It is actually equivalent to a Gaussian process model with covariance function :

where ϕ {\displaystyle \varphi } is the kernel function (usually Gaussian), α j {\displaystyle \alpha _{j}} are the variances of the prior on the weight vector w ~ N (0 , α – 1 I) {\displaystyle w\sim N(0,\alpha ^{-1}I)} , and x 1 , … , x N {\displaystyle \mathbf {x} _{1},\ldots ,\mathbf {x} _{N}} are the

input vectors of the training set . [4]

Compared to that of support vector machines (SVM), the Bayesian formulation of the RVM avoids the set of free parameters of the SVM (that usually require cross-validation-based post-optimizations). However RVMs use an expectation maximization (EM)-like learning method and are therefore at risk of local minima. This is unlike the standard sequential minimal optimization (SMO)-based algorithms employed by SVMs , which are guaranteed to find a global optimum (of the convex problem).

The relevance vector machine was patented in the United States by Microsoft (patent expired September 4, 2019). [5]

See also

Kernel trick

Platt scaling : turns an SVM into a probability model

References