

R documentation

of ‘gpr.Rd’

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`gpr`

Gaussian process regression function.

Description

This function delivers two applications: 1. Training : When no test data are given, the function returns minus the log likelihood and its partial derivatives with respect to the hyperparameters. Training method is to fit the hyperparameters.

2.Prediction: If test data are given, then marginal Gaussian predictions are computed, and function returns mean and variance describing the Gaussian predictions. In cases where the covariance function has noise contributions, the variance returned in S2 variable is for noisy test targets. To have variance of the noise-free latent function, the noise variance should be subtracted .

Usage

```
gpr(logtheta, covfunc.gpr, x, y, xstar = NULL, partial.derivatives = FALSE)
```

Arguments

<code>logtheta</code>	<code>logtheta</code> is a vector that specifies hyperparameter variable.
<code>covfunc.gpr</code>	<code>covfunc.gpr</code> is a string value containing name of a covariance function to apply <code>gpr</code> on it.
<code>x</code>	<code>x</code> is Input parameter array and it is passed to <code>covfunc.gpr</code> function in <code>gpr</code> application. Its a <code>n</code> by <code>D</code> array
<code>y</code>	<code>y</code> is an other input parameter of <code>covfunc.gpr</code> function in <code>gpr</code> application. It is usually a vector that defines target value of function <code>covfunc.gpr</code> and the input array <code>x</code> and has <code>n</code> rows.
<code>xstar</code>	<code>xstar</code> is input array of test data. It has the same dimentions of <code>x</code> .
<code>partial.derivatives</code>	Logical value that when it is <code>TRUE</code> and the test data is given <code>gpr</code> executes prediction process.

Details

There are only `covSum`, `covNoise` and `covSEiso` covariance functions available in this package to be used with gaussian process. More ever this is an open source script with line by line description so that you can learn the code and write your own covariance functions to call `gpr` on them. If you like to contribute and add your own functions to this package please contact the package maintainer. Please refer to references to get info about the other consistent covariance functions.

Value

When `partial.derivatives` is `FALSE` returns a list containing minus the log likelihood and its vector of partial derivatives. When `partial.derivatives` is `TRUE` returns a list that consists of two objects. The first is a mean vector which same number of rows of `x` and `y` and the second object variance vector that has same number of rows of `x` and `y`. They describe the result Gaussian prediction.

Author(s)

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References

1. Carl Edward Rasmussen and Christopher K. I. Williams. Gaussian Processes for Machine Learning. *MIT Press*, 2006. ISBN 0-262-18253-X.
2. Carl Edward Rasmussen & Hannes Nickisch. `gpml`(GAUSSIAN PROCESS REGRESSION AND CLASSIFICATION Toolbox) Matlab Library.

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