

Package ‘hgam’

July 2, 2014

Title High-dimensional Additive Modelling

Version 0.1-2

Date 2013-05-13

Author The students of the ‘Advanced R Programming Course’ Hannah Frick, Ivan Kondofersky, Oliver S. Kuehnle, Christian Lindenlaub, Georg Pfundstein, Matthias Speidel, Martin Spindler, Ariane Straub, Florian Wickler, Katharina Zink under the supervision of Manuel Eugster and Torsten Hothorn

Maintainer Manuel Eugster <Manuel.Eugster@stat.uni-muenchen.de>

Description

High-dimensional additive models as introduced by Meier, van der Geer and Buehlmann (2009).

Depends grplasso, splines, lattice, rgl

Suggests parallel

License GPL-2

NeedsCompilation no

Repository CRAN

Date/Publication 2013-05-13 23:05:04

R topics documented:

hgam-package	2
dgp	2
hgam	3
hrisk	4
methods.hgam	5

Index	7
--------------	----------

hgam-package

Fitting high-dimensional generalized additive models

Description

hgam is used to fit high-dimensional generalized additive models.

Details

Package: hgam
Type: Package
Version: 0.1-0
Date: 2010-02-09
License: GPL-2

The package implements high-dimensional additive models as introduced by Meier et al. (2009).

Author(s)

The students of the ‘Advanced R Programming Course’ (winter term 2009/2010) at LMU Muenchen: Hannah Frick, Ivan Kondofersky, Oliver S. Kuehnle, Christian Lindenlaub, Georg Pfundstein, Matthias Speidel, Martin Spindler, Ariane Straub, Florian Wickler, Katharina Zink under the supervision of Manuel Eugster <Manuel.Eugster@stat.uni-muenchen.de> (package maintainer) and Torsten Hothorn.

References

Meier, L., van de Geer, S. and Buehlmann, P. (2009). High-dimensional additive modeling. *Annals of Statistics* **37**, 3779–3821.

dgp

Sample data generating process

Description

Sample data generating process

Usage

dgp(n, sd = 1)

Arguments

n sample size
sd standard deviation

Value

data.frame

See Also[hgam](#), [rnorm](#), [sin](#)

hgam*Fitting high-dimensional generalized additive models*

Description

hgam is used to fit high-dimensional generalized additive models.

Usage

```
hgam(formula, data = NULL, weights, model = LinReg(),
      nknots = 20, lambda1 = 2, lambda2 = 3, ...)
```

Arguments

formula	an object of class formula (or one that can be coerced to that class): a symbolic description of the model to be fitted.
data	a data frame.
weights	vector of weights.
model	an object of class grpl.model implementing the negative log-likelihood, gradient, hessian etc. See the documentation of grpl.model for more details.
nknots	number of knots.
lambda1	grouplasso penalty term.
lambda2	smoothing penalty term.
...	ignored.

Value

hgam returns an object of class hgam:

y	response
x	covariables
Btilde	model matrix
coef	coefficients
Btildenew	function to set up the model matrix for (new) data

See Also[grplasso](#)

Examples

```
test.d <- dgp(1000)
test.m <- hgam(y ~ ., data = test.d)
```

hrisk

Cross-Validation

Description

Cross-validated estimation of the empirical risk for hyper-parameter selection.

Usage

```
hrisk(object, folds = 10, type = c("cv", "bootstrap", "subsampling"),
      nlambda1 = 10, lambda2 = 1:10, trace = TRUE,
      papply = if (require("multicore")) mclapply else lapply)
```

Arguments

object	an object of class <code>hrisk</code>
folds	a weight matrix with number of rows equal to the number of observations. The number of columns corresponds to the number of cross-validation runs.
type	type of the cross-validation
nlambda1	ignored
lambda2	ignored
trace	ignored
papply	adfa

Details

If package `multicore` is available, `hrisk` runs in parallel on cores/processors available.

Value

object returns an object of class `hrisk`.

methods.hgam	<i>Methods for displaying information about high-dimensional generalized additive models</i>
--------------	--

Description

print.hgam is used to display some information about the fitted GAMs. plot.hgam plot the marginal effects of the two selected covariates. fitted.hgam is used to predict the original data with the fitted GAM model. coef.hgam is used to display the fitted coefficients. predict.hgam is used to predict (new) data with the fitted GAM model. logLik.hgam is used to display the value of the log likelihood function. print.hrisk is used to display the results of the hrisk function.

Usage

```
## S3 method for class 'hgam'
print(x, ...)
## S3 method for class 'hgam'
plot(x, which = NULL, newdata = NULL,
     rug = TRUE, multidim = FALSE, ...)
## S3 method for class 'hgam'
fitted(object, ...)
## S3 method for class 'hgam'
coef(object, ...)
## S3 method for class 'hgam'
predict(object, newdata = NULL, which = NULL, intercept = NULL, ...)
## S3 method for class 'hgam'
logLik(object, ...)
## S3 method for class 'hrisk'
print(h, ...)
```

Arguments

x	an object of class hgam
object	an object of class hgam
newdata	a data frame. If newdata = NULL then original data will be used.
which	which covariate to be predicted. Character or integer can both be used. If which = NULL all predictors will be used.
multidim	when multidim = TRUE the marginal effects of the two selected covariates is plotted in a three-dimensional grid.
intercept	boolean or NULL. If intercept = NULL then the function uses the same intercept options as specified in hgam.
h	an object of the class hrisk.
rug	logical, add rugs to plots.
...	ignored.

Examples

```
test.d <- dgp(1000)
test.m <- hgam(y ~ ., data = test.d)

print(test.m)
coef(test.m)
fitted(test.m)
predict(test.m)
logLik(test.m)
plot(test.m, which = c("x1", "x2"), multidim = TRUE)
```

Index

*Topic **data**

dgp, [2](#)

*Topic **methods**

methods.hgam, [5](#)

*Topic **models**

hgam, [3](#)

hrisk, [4](#)

*Topic **package**

hgam-package, [2](#)

coef.hgam (methods.hgam), [5](#)

dgp, [2](#)

fitted.hgam (methods.hgam), [5](#)

formula, [3](#)

grpl.model, [3](#)

grplasso, [3](#)

hgam, [3](#), [3](#)

hgam-package, [2](#)

hrisk, [4](#), [4](#)

logLik.hgam (methods.hgam), [5](#)

methods.hgam, [5](#)

plot.hgam (methods.hgam), [5](#)

predict.hgam (methods.hgam), [5](#)

print.hgam (methods.hgam), [5](#)

print.hrisk (methods.hgam), [5](#)

rnorm, [3](#)

sin, [3](#)