

Package ‘hmlasso’

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Type Package

Title Lasso with High Missing Rate

Version 0.0.1

Description A simple implementation of HMLasso (Lasso with High Missing rate).
Takada, M., Fujisawa, H., & Nishikawa, T. (2019) <[arXiv:1811.00255](#)>.

License GPL-2 | GPL-3

Encoding UTF-8

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LinkingTo Rcpp, BH

Imports Rcpp, MASS, Matrix, RSpectra

Suggests knitr, rmarkdown, testthat

VignetteBuilder knitr

RoxygenNote 6.1.1

NeedsCompilation yes

Author Masaaki Takada [aut, cre],
Toshiba [aut, cph]

Maintainer Masaaki Takada <masaaki1.takada@toshiba.co.jp>

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 cv.hmlasso

Fit a model using a design matrix with cross validation

Description

Fit a model using a design matrix with cross validation

Usage

```
cv.hmlasso(X, y, nfolds = 10, lambda.min.ratio = 0.01, nlambda = 100,
  lambda = NULL, foldid = NULL, unit = "sample", seed = 0,
  min_eig_th = 1e-06, use = "pairwise.complete.obs",
  impute_method = "mean", direct_prediction = FALSE,
  adjust_by_tr = FALSE, positify = "diag", weight_power = 1,
  mu = 1, eig_tol = 1e-08, eig_maxitr = 1e+08, verbose = FALSE,
  ...)
```

Arguments

X	matrix of explanatory variables
y	vector of objective variable
nfolds	the number of folds (ignored if foldid is specified)
lambda.min.ratio	ratio of max lambda and min lambda (ignored if lambda is specified)
nlambda	the number of lambda (ignored if lambda is specified)
lambda	lambda sequence
foldid	vector indicating id of fold for each sample
unit	unit for cross validation error: "sample" (default) or "fold"
seed	random seed of cross validation
min_eig_th	minimum eigenvalue
use	method to calculate correlation matrix from missing data (default "pairwise.complete.obs")
impute_method	imputation method for predictions
direct_prediction	either corrected cross validation is used or not
adjust_by_tr	whether mean (or median) of training data for prediction is used or not
positify	method for solving PSD matrix
weight_power	weighting power (default 0 meaning no-weighting)
mu	augmented Lagrangian parameter
eig_tol	tol parameter in eigs_sym function
eig_maxitr	maxitr parameter in eigs_sym
verbose	whether output verbose warnings and messages (default FALSE)
...	parameters of hmlasso function

Value

lasso model	
fit	lasso model with hole data
lambda.min	lambda with minimum cross validation error
lambda.min.index	index of lambda.min
lambda.1se	largest lambda such that error is within 1 standard error of the minimum
lambda.1se.index	index of lambda.1se
foldid	fold id
cve	cross validation error
cvse	cross validation standard error
cvup	cross validation error + standard error
cvlo	cross validation error - standard error
pe	prediction error (for family="binomial")

Examples

```
X_incompl <- as.matrix(iris[, 1:3])
X_incompl[1:5,1] <- NA
X_incompl[6:10,2] <- NA
y <- iris[, 4]
cv_fit <- cv.hmlasso(X_incompl, y, nlambda=50, lambda.min.ratio=1e-2)
plot(cv_fit)
plot(cv_fit$fit)
```

hmlasso

Fit a model using a design matrix

Description

Fit a model using a design matrix

Usage

```
hmlasso(X, y, family = "gaussian", impl = "cpp",
  lambda.min.ratio = 0.01, nlambda = 100, lambda = NULL,
  min_eig_th = 1e-06, use = "pairwise.complete.obs",
  positify = "diag", weight_power = 1, eig_tol = 1e-08,
  eig_maxitr = 1e+08, mu = 1, verbose = FALSE, ...)
```

Arguments

<code>X</code>	matrix of explanatory variables
<code>y</code>	vector of objective variable
<code>family</code>	family of regression: "gaussian" (default) or "binomial"
<code>impl</code>	implementation language of optimization (only "cpp" is supported)
<code>lambda.min.ratio</code>	ratio of max lambda and min lambda (ignored if lambda is specified)
<code>nlambda</code>	the number of lambda (ignored if lambda is specified)
<code>lambda</code>	lambda sequence
<code>min_eig_th</code>	threshold of the minimum eigenvalue in the PSD matrix problem.
<code>use</code>	method to calculate correlation matrix from missing data (default "pairwise.complete.obs")
<code>positify</code>	method for solving PSD matrix
<code>weight_power</code>	weighting power (default 0 meaning no-weighting)
<code>eig_tol</code>	tol parameter in <code>eigs_sym</code> function
<code>eig_maxitr</code>	maxitr parameter in <code>eigs_sym</code>
<code>mu</code>	augmented Lagrangian parameter
<code>verbose</code>	whether output verbose warnings and messages (default FALSE)
<code>...</code>	parameters for optimization

Value

lasso model	
<code>beta</code>	coefficients
<code>beta_standard</code>	standardized coefficients
<code>a0</code>	intercepts
<code>lambda</code>	regularization parameters
<code>family</code>	family

Examples

```
X_incompl <- as.matrix(iris[, 1:3])
X_incompl[1:5,1] <- NA
X_incompl[6:10,2] <- NA
y <- iris[, 4]
fit <- hmlasso(X_incompl, y, nlambda=50, lambda.min.ratio=1e-2)
plot(fit)
```

plot.cv.hmlasso *Plot a cross validation error path*

Description

Plot a cross validation error path

Usage

```
## S3 method for class 'cv.hmlasso'  
plot(x, xlim = NULL, ylim = NULL, ...)
```

Arguments

x	cross validated hmlasso model
xlim	x range
ylim	y range
...	parameters of

Examples

```
X_incompl <- as.matrix(iris[, 1:3])  
X_incompl[1:5,1] <- NA  
X_incompl[6:10,2] <- NA  
y <- iris[, 4]  
cv_fit <- cv.hmlasso(X_incompl, y, nlambda=50, lambda.min.ratio=1e-2)  
plot(cv_fit)  
plot(cv_fit$fit)
```

plot.hmlasso *Plot a solution path*

Description

Plot a solution path

Usage

```
## S3 method for class 'hmlasso'  
plot(x, xlim = NULL, ylim = NULL, ...)
```

Arguments

x	hmlasso model
xlim	x range
ylim	y range
...	parameters of matlines function

Examples

```
X_incompl <- as.matrix(iris[, 1:3])
X_incompl[1:5,1] <- NA
X_incompl[6:10,2] <- NA
y <- iris[, 4]
fit <- hmlasso(X_incompl, y, nlambda=50, lambda.min.ratio=1e-2)
plot(fit)
```

predict.hmlasso	<i>Predict responses</i>
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Description

Predict responses

Usage

```
## S3 method for class 'hmlasso'
predict(object, newx, s = NULL,
        impute_method = "mean", adjust_by_tr = FALSE, ...)
```

Arguments

object	hmlasso model
newx	matrix of explanatory variables
s	selected lambda (default: all)
impute_method	imputation method for predictions (default: "mean")
adjust_by_tr	whether mean (or median) of training data for prediction is used or not
...	parameters of predict function

Examples

```
X_incompl <- as.matrix(iris[, 1:3])
X_incompl[1:5,1] <- NA
X_incompl[6:10,2] <- NA
y <- iris[, 4]
cv_fit <- cv.hmlasso(X_incompl, y, nlambda=50, lambda.min.ratio=1e-2)
predict(cv_fit$fit, X_incompl)
```

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