Package 'pros'

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Title Penalized Regression on Steroids

Version 0.1

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Description This is a project for STAT8053 at the University of Minnesota.

Depends R (>= 3.5.1)

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Encoding UTF-8

LazyData true

RoxygenNote 6.1.1

R topics documented:

`cv.pros` *Cross-validation*

Description

The `cv.pros` function is used for K-fold cross-validation.

Usage

```
cv.pros(X, y, K_fold = 10, alpha = c(1, 0, 0, 0, 0, 0),
  lambdas = c(), step_size, algorithm = "proximal_gradient_cd",
  max_iter = 10000, tolerance = 10^(-8), random_seed = 0)
```

Arguments

X	is an $n \times m$-dimensional matrix of the data.
y	is an $n \times m$-dimensional matrix of the data.
K_fold	is the number of folds in cross-validation.
alpha	is a 6-dimensional vector of the convex combination corresponding to the penalization: • α_1 is the l^1 penalty. • α_2 is the l^2 penalty. • α_3 is the l^4 penalty. • α_4 is the l^6 penalty. • α_5 is the l^8 penalty. • α_6 is the l^10 penalty.
lambdas	is a vector of dual penalization values to be evaluated.
step_size	is a tuning parameter defining the step size. Larger values are more aggressive and smaller values are less aggressive.
algorithm	is the optimization algorithm • proximal_gradient_cd uses proximal gradient coordinate descent. • subgradient_cd uses subgradient coordinate descent.
max_iter	is the maximum iterations the algorithm will run regardless of convergence.
tolerance	is the accuracy of the stopping criterion.
random_seed	is the random seed used in the algorithms.

Value

A class cv_pros

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predict.cv_pros *Cross-validation Prediction*

Description

The prediction function for cv.pros.

Usage

```
## S3 method for class 'cv_pros'
predict(cv_prosObj, X_new)
```

Arguments

cv_prosObj	an object of class cv_pros
X_new	is an $n \times m$-dimensional matrix of the data.

Value

A vector of prediction values.

predict.pros *Pros Prediction*

Description

The prediction function for pros.

Usage

```
## S3 method for class 'pros'
predict(prosObj, X)
```

Arguments

prosObj	an object of class pros
X	is an $n \times m$-dimensional matrix of the data.

Value

A vector of prediction values.

pros *Pros*

Description

The pros function is used to fit a single regression model with a specified penalization.

Usage

```
pros(X, y, alpha = c(1, 0, 0, 0, 0, 0), lambda, step_size,
  algorithm = "proximal_gradient_cd", max_iter = 10000,
  tolerance = 10^(-8), random_seed = 0)
```

Arguments

X	is an $n \times m$-dimensional matrix of the data.
y	is an $n \times m$-dimensional matrix of the data.
alpha	is a 6-dimensional vector of the convex combination corresponding to the penalization: • α_1 is the l^1 penalty. • α_2 is the l^2 penalty. • α_3 is the l^4 penalty. • α_4 is the l^6 penalty. • α_5 is the l^8 penalty. • α_6 is the l^10 penalty.
lambda	is the Lagrangian dual penalization parameter.

`step_size`	is a tuning parameter defining the step size. Larger values are more aggressive and smaller values are less aggressive.
`algorithm`	is the optimization algorithm • `proximal_gradient_cd` uses proximal gradient coordinate descent. • `subgradient_cd` uses subgradient coordinate descent.
`max_iter`	is the maximum iterations the algorithm will run regardless of convergence.
`tolerance`	is the accuracy of the stopping criterion.
`random_seed`	is the random seed used in the algorithms.

Value

A class `pros`

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