Package 'pros'

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Title Penalized Regression on Steroids

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Author Austin David Brown <brow5079@umn.edu>

Maintainer Austin David Brown <brow5079@umn.edu>

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

Depends R (>= 3.5.1)

License GPL-2

Encoding UTF-8

LazyData true

RoxygenNote 6.1.1

R topics documented:

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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 $l^1 0$ 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.

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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.

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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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