

Package ‘pigMLcore’

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Type Package

Title What the Package Does (Title Case)

Version 0.4.0

Author Tianfu Yang

Maintainer Tianfu Yang <tianfu@ualberta.ca>

Description More about what it does (maybe more than one line)

Use four spaces when indenting paragraphs within the Description.

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Encoding UTF-8

LazyData true

RoxygenNote 7.1.0

Imports mlbench,

caret,
doParallel,
parallel,
glmnet,
testthat,
ranger,
elasticnet,
e1071,
xgboost,
kernlab,
tensorflow,
keras

R topics documented:

calculate_lambda_max	2
calculate_search_grid_en	3
calculate_search_grid_mlpL2	3
calculate_search_grid_rf	4
calculate_search_grid_svr1	4
calculate_search_grid_svrp	5
calculate_search_grid_svr	6
calculate_search_grid_xgbl	6
calculate_search_grid_xgbt	7

check_input_data	7
check_input_foldset	8
check_input_seed	8
cla_en	9
cla_rf	10
cla_svrl	11
cla_svrp	12
cla_svrr	13
cla_xgbl	14
cla_xgbt	15
pigMLcore	16
pre_prosess_in_CV	16
reg_en	17
reg_mlpL2	18
reg_rf	19
reg_rr	20
reg_svrl	21
reg_svrp	22
reg_svrr	23
reg_xgbl	24
reg_xgbt	25
Index	26

calculate_lambda_max	<i>calculate data-based lambda.max</i>
----------------------	--

Description

DESCRIPTION

Usage

calculate_lambda_max(y, X, alpha)

Arguments

- | | |
|-------|--|
| y | the responding variable. The function assume it is non-missing |
| X | the full feature dataset |
| alpha | the alpha hyperparameter |

Value

name a	description
--------	-------------

Note

The function calculate the minimal lambda that shrinks all regression coefficients into zero (lambda.max) based on the data:

`calculate_search_grid_en`*calculate the whole grid for lasso*

Description

DESCRIPTION

Usage`calculate_search_grid_en(y, X, n_alpha, n_lambda, lambda_ratio = NULL)`**Arguments**

<code>y</code>	the responding variable. The function assume it is non-missing
<code>X</code>	the full feature dataset
<code>n_alpha</code>	number of alpha tested in the grid
<code>n_lambda</code>	number of lambda tested in the grid
<code>lambda_ratio</code>	Smallest value for lambda, as a fraction of lambda.max,

Value

a data frame

Note

A search grid calculated based on the input data

`calculate_search_grid_mlpL2`*calculate the whole grid for MLP with L2 penalty*

Description

DESCRIPTION

Usage`calculate_search_grid_mlpL2(y, X, n_size, n_lambda)`**Arguments**

<code>y</code>	the responding variable. The function assume it is non-missing
<code>X</code>	the full feature dataset
<code>n_size</code>	number of size in grid search,
<code>n_lambda</code>	number of lambda in grid search,

Value

a data frame

Note

A search grid calculated based on the input data

`calculate_search_grid_rf`*calculate the whole grid for rf*

Description

DESCRIPTION

Usage

```
calculate_search_grid_rf(y, X, n_mtry, n_MNS)
```

Arguments

y	the responding variable. The function assume it is non-missing
X	the full feature dataset
n_mtry	number of mtry tested in the grid
n_MNS	number of min.node.size tested in the grid

Value

a data frame

Note

A search grid calculated based on the input data

`calculate_search_grid_svr1`*calculate the whole grid for SVR linear kernel*

Description

DESCRIPTION

Usage

```
calculate_search_grid_svr1(y, X, n_C)
```

Arguments

y	the responding variable. The function assume it is non-missing
X	the full feature dataset
n_C	number of Cost in grid search,

Value

a data frame

Note

A search grid calculated based on the input data

calculate_search_grid_svrp

calculate the whole grid for SVR Polynomial kernel

Description

DESCRIPTION

Usage

```
calculate_search_grid_svrp(y, X, n_C, n_degree, n_Scale)
```

Arguments

y	the responding variable. The function assume it is non-missing
X	the full feature dataset
n_C	number of Cost in grid search,
n_degree	number of degree in grid search,
n_Scale	number of Scale in grid search,

Value

a data frame

Note

A search grid calculated based on the input data

calculate_search_grid_svrr
calculate the whole grid for SVR RBF kernel

Description

DESCRIPTION

Usage

```
calculate_search_grid_svrr(y, X, n_C)
```

Arguments

y	the responding variable. The function assume it is non-missing
X	the full feature dataset
n_C	number of Cost in grid search

Value

a data frame

Note

A search grid calculated based on the input data

calculate_search_grid_xgbl
calculate the whole grid for xgblinear

Description

DESCRIPTION

Usage

```
calculate_search_grid_xgbl(y, X, n_rounds, n_reg)
```

Arguments

y	the responding variable. The function assume it is non-missing
X	the full feature dataset
n_rounds	number of # boosting iterations
n_reg	number of tested regularization parameter

Value

a data frame

Note

A search grid calculated based on the input data

calculate_search_grid_xgbt	<i>calculate the whole grid for xgbtree</i>
----------------------------	---

Description

DESCRIPTION

Usage

```
calculate_search_grid_xgbt(y, X, n_rounds, n_depth, n_seq)
```

Arguments

y	the responding variable. The function assume it is non-missing
X	the full feature dataset
n_rounds	number of nrounds in grid search,
n_depth	number of depth in grid search,
n_seq	number of gamma/min_child_weight in grid search,

Value

a data frame

Note

A search grid calculated based on the input data

check_input_data	<i>check the data for the prediction</i>
------------------	--

Description

DESCRIPTION

Usage

```
check_input_data(y, X, verbose = FALSE)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
verbose	output level: True for more logs.

Value

a idx of data records available for the prediction (no missing)

Note

The function checks the missing values and dimension of the dataset

check_input_foldset	<i>check foldset</i>
---------------------	----------------------

Description

DESCRIPTION

Usage

```
check_input_foldset(foldset, y, K, verbose = FALSE)
```

Arguments

foldset	provide a foldset to control random sampling error.
y	the responding variable. The function assume it is non-missing
K	integer, the number of folds in the CV
verbose	output level: True for more logs.

Value

Checked foldset - the same structure as caret::createFolds()

Note

check the foldset. If there is none, create one

check_input_seed	<i>check the seed of the analysis</i>
------------------	---------------------------------------

Description

DESCRIPTION

Usage

```
check_input_seed(seed)
```

Arguments

seed	integer or NULL, the input seed
------	---------------------------------

Note

Create a new seed or check an existing seed

cla_en

*Prediction with EN and evaluation through CV - classification***Description**

DESCRIPTION

Usage

```
cla_en(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  lasso_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  lasso_TG = NULL,
  n_alpha = 10,
  n_lambda = 100,
  nc = 1
)
```

Arguments

y	the responding variable - binary
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
lasso_TC	trControl that pass to caret
lasso_TG	tuneGrid that pass to caret
n_alpha	number of alpha tested in the grid
n_lambda	number of lambda tested in the grid
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using EN through CV.

cla_rf

*Prediction with RF and evaluation through CV***Description**

DESCRIPTION

Usage

```
cla_rf(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  verbose = FALSE,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  rf_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  rf_TG = NULL,
  n_mtry = 10,
  n_MNS = 5,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
verbose	output log or not
pb	show pgbar or not
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
rf_TC	trControl that pass to caret
rf_TG	tuneGrid that pass to caret
n_mtry	number of ntry tested in the grid
n_MNS	number of min.node.size tested in the grid
nc	number of cpus to use in parallel- should be 1

Value

a list

Note

The function provide a general way to evaluate the prediction using RF through CV.

cla_svrl

*Prediction with SVR linear and evaluation through CV***Description**

DESCRIPTION

Usage

```
cla_svrl(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  svrl_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  svrl_TG = NULL,
  n_C = 15,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
svrl_TC	trControl that pass to caret
svrl_TG	tuneGrid that pass to caret
n_C	number of Cost in grid search,
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using SVR linear through CV.

cla_svrp

*Prediction with SVR polynomial and evaluation through CV***Description**

DESCRIPTION

Usage

```
cla_svrp(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  svrp_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  svrp_TG = NULL,
  n_C = 10,
  n_degree = 3,
  n_Scale = 3,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or not
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
svrp_TC	trControl that pass to caret
svrp_TG	tuneGrid that pass to caret
n_C	number of Cost in grid search
n_degree	number of degree in grid search,
n_Scale	number of Scale in grid search,
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using SVR polynomial through CV.

cla_svrr	<i>Prediction with SVR polynomialand evaluation through CV</i>
----------	--

Description

DESCRIPTION

Usage

```
cla_svrr(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  svrr_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  svrr_TG = NULL,
  n_C = 10,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
svrr_TC	trControl that pass to caret
svrr_TG	tuneGrid that pass to caret
n_C	number of Cost in grid search
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using SVR RBF through CV.

cla_xgbl

*Prediction with XGBlinear and evaluation through CV***Description**

DESCRIPTION

Usage

```
cla_xgbl(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  xgbl_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  xgbl_TG = NULL,
  n_rounds = 10,
  n_reg = 5,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
xgbl_TC	trControl that pass to caret
xgbl_TG	tuneGrid that pass to caret
n_rounds	number of # boosting iterations
n_reg	number of tested regularization parameter
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using xgboost through CV.

cla_xgbt

*Prediction with XGBTree and evaluation through CV***Description**

DESCRIPTION

Usage

```
cla_xgbt(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  xgbt_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  xgbt_TG = NULL,
  n_rounds = 8,
  n_depth = 5,
  n_seq = 5,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
xgbt_TC	trControl that pass to caret
xgbt_TG	tuneGrid that pass to caret
n_rounds	number of nrounds in grid search,
n_depth	number of depth in grid search,
n_seq	number of gamma/min_child_weight in grid search,
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using xgboost through CV.

pigMLcore	<i>pigMLcore: The core analysis module for the pigML project.</i>
-----------	---

Description

pigMLcore: The core analysis module for the pigML project.

Author(s)

Tianfu Yang <tianfu@ualberta.ca> Maintainer: Tianfu Yang <tianfu@ualberta.ca>

pre_prosess_in_CV	<i>preprocess the feature data in CV</i>
-------------------	--

Description

DESCRIPTION

Usage

```
pre_prosess_in_CV(X, idx_test, n_pca)
```

Arguments

X	the full feature dataset
idx_test	the idx of test records in the current fold
n_pca	number of selected top PCs. Null for no PCA

Value

A list including the transformed training and testing data

Note

Pre-process the feature matrix in cross-validation. if n_pca is given, the processing includes PCA and scaling. Otherwise it is simply scaling.

reg_en

*Prediction with EN and evaluation through CV***Description**

DESCRIPTION

Usage

```
reg_en(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  lasso_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  lasso_TG = NULL,
  n_alpha = 10,
  n_lambda = 100,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
lasso_TC	trControl that pass to caret
lasso_TG	tuneGrid that pass to caret
n_alpha	number of alpha tested in the grid
n_lambda	number of lambda tested in the grid
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using EN through CV.

reg_mlpL2

*Prediction with XGBTree and evaluation through CV***Description**

DESCRIPTION

Usage

```
reg_mlpL2(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  mlpL2_TC = trainControl(method = "cv", number = 2, verboseIter = F),
  mlpL2_TG = NULL,
  n_size = 5,
  n_lambda = 3,
  epoch = 200
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
mlpL2_TC	trControl that pass to caret
mlpL2_TG	tuneGrid that pass to caret
n_size	number of size in grid search,
n_lambda	number of lambda in grid search,
epoch	epoch in the training

Value

a list

Note

The function provide a general way to evaluate the prediction using xgboost through CV.

reg_rf

*Prediction with RF and evaluation through CV***Description**

DESCRIPTION

Usage

```
reg_rf(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  verbose = FALSE,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  rf_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  rf_TG = NULL,
  n_mtry = 10,
  n_MNS = 5,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
verbose	output log or not
pb	show pgbar or not
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
rf_TC	trControl that pass to caret
rf_TG	tuneGrid that pass to caret
n_mtry	number of ntry tested in the grid
n_MNS	number of min.node.size tested in the grid
nc	number of cpus to use in parallel- should be 1

Value

a list

Note

The function provide a general way to evaluate the prediction using RF through CV.

reg_rr

Prediction with EN and evaluation through CV

Description

DESCRIPTION

Usage

```
reg_rr(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  verbose = FALSE,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  rr_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
verbose	output log or not
pb	show pgbar or not
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
rr_TC	trControl that pass to caret
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using EN through CV.

reg_svr1

*Prediction with SVR linear and evaluation through CV***Description**

DESCRIPTION

Usage

```
reg_svr1(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  svr1_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  svr1_TG = NULL,
  n_C = 15,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
svr1_TC	trControl that pass to caret
svr1_TG	tuneGrid that pass to caret
n_C	number of Cost in grid search,
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using SVR linear through CV.

reg_svrp

*Prediction with SVR polynomial and evaluation through CV***Description**

DESCRIPTION

Usage

```
reg_svrp(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  svrp_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  svrp_TG = NULL,
  n_C = 10,
  n_degree = 3,
  n_Scale = 3,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or not
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
svrp_TC	trControl that pass to caret
svrp_TG	tuneGrid that pass to caret
n_C	number of Cost in grid search
n_degree	number of degree in grid search,
n_Scale	number of Scale in grid search,
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using SVR polynomial through CV.

reg_svrr	<i>Prediction with SVR polynomial and evaluation through CV</i>
----------	---

Description

DESCRIPTION

Usage

```
reg_svrr(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  svrr_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  svrr_TG = NULL,
  n_C = 10,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
svrr_TC	trControl that pass to caret
svrr_TG	tuneGrid that pass to caret
n_C	number of Cost in grid search
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using SVR RBF through CV.

reg_xgb1

*Prediction with XGBlinear and evaluation through CV***Description**

DESCRIPTION

Usage

```
reg_xgb1(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  xgb1_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  xgb1_TG = NULL,
  n_rounds = 10,
  n_reg = 5,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
xgb1_TC	trControl that pass to caret
xgb1_TG	tuneGrid that pass to caret
n_rounds	number of # boosting iterations
n_reg	number of tested regularization parameter
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using xgboost through CV.

reg_xgbt

*Prediction with XGBTree and evaluation through CV***Description**

DESCRIPTION

Usage

```
reg_xgbt(
  y,
  X,
  job_name = "new_job",
  K = 10,
  n_pca = NULL,
  pb = FALSE,
  foldset = NULL,
  seed = NULL,
  xgbt_TC = trainControl(method = "cv", number = 5, verboseIter = F),
  xgbt_TG = NULL,
  n_rounds = 8,
  n_depth = 5,
  n_seq = 5,
  nc = 1
)
```

Arguments

y	the responding variable
X	the feature matrix. No missing allowed
job_name	A character of job ID
K	integer, the number of folds in the CV
n_pca	number of selected top PCs. Null for no PCA
pb	show pgbar or nots
foldset	provide a foldset to control random sampling error.
seed	provide a seed to reproduce a result. NULL by default
xgbt_TC	trControl that pass to caret
xgbt_TG	tuneGrid that pass to caret
n_rounds	number of nrounds in grid search,
n_depth	number of depth in grid search,
n_seq	number of gamma/min_child_weight in grid search,
nc	number of cpus to use in parallel

Value

a list

Note

The function provide a general way to evaluate the prediction using xgboost through CV.

Index

[calculate_lambda_max, 2](#)
[calculate_search_grid_en, 3](#)
[calculate_search_grid_mlpL2, 3](#)
[calculate_search_grid_rf, 4](#)
[calculate_search_grid_svrL, 4](#)
[calculate_search_grid_svrp, 5](#)
[calculate_search_grid_svrR, 6](#)
[calculate_search_grid_xgbl, 6](#)
[calculate_search_grid_xgbt, 7](#)
[check_input_data, 7](#)
[check_input_foldset, 8](#)
[check_input_seed, 8](#)
[cla_en, 9](#)
[cla_rf, 10](#)
[cla_svrL, 11](#)
[cla_svrp, 12](#)
[cla_svrR, 13](#)
[cla_xgbl, 14](#)
[cla_xgbt, 15](#)

[pigMLcore, 16](#)
[pre_prosess_in_CV, 16](#)

[reg_en, 17](#)
[reg_mlpL2, 18](#)
[reg_rf, 19](#)
[reg_rr, 20](#)
[reg_svrL, 21](#)
[reg_svrp, 22](#)
[reg_svrR, 23](#)
[reg_xgbl, 24](#)
[reg_xgbt, 25](#)