

Package ‘roccv’

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Type Package

Title ROC for Cross Validation Results

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Author Ben Sherwood [aut, cre]

Depends R (>= 3.0.0), glmnet, parallel, pROC

Maintainer Ben Sherwood <ben.sherwood@ku.edu>

Description Cross validate large genetic data while specifying clinical variables that should always be in the model using the function `cv()`. An ROC plot from the cross validation data with AUC can be obtained using `rocplot()`, which also can be used to compare different models. Framework was built to handle genetic data, but works for any data.

ByteCompile TRUE

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cv

*Cross validation results for a model***Description**

Cross validation results for a model

Usage

```
cv(clinical_x = NULL, genomic_x = NULL, y = NULL, data = NULL,
   clinical_formula = NULL, family = "binomial", folds = NULL, k = 10,
   fit_method = "glm", method_name = NULL, n.cores = 1, ...)
```

Arguments

clinical_x	clinical variables that will always be included in the model
genomic_x	genomic variables that will be penalized if a penalized model is used
y	response variables
data	dataframe if clinical formula is used
clinical_formula	formula for clinical variables
family	gaussian, binomial or poisson
folds	predefined partitions for cross validation
k	number of cross validation folds. A value of k=n is leave one out cross validation.
fit_method	glm or glmnet used to fit the model
method_name	tracking variable to include in return dataframe
n.cores	Number of cores to be used
...	additional commands to glm or cv.glmnet

Value

returns a dataframe of predicted values and observed values. In addition, method_name is recorded if that variable is defined.

Author(s)

Ben Sherwood <ben.sherwood@ku.edu>

Examples

```
x <- matrix(rnorm(800),ncol=8)
y <- runif(100) < exp(1 + x[,1] + x[,5])/(1+exp(1 + x[,1] + x[,5]))
cv_results <- cv(x,y=y,method_name="without_formula")
combined_data <- data.frame(y=y,x1=x[,1],x5=x[,5])
gx <- x[,c(2,3,4,6,7,8)]
cvf <- cv(genomic_x=gx,clinical_formula=y~x1+x5,data=combined_data,method_name="with_form")
```

fit_pred_fold	<i>Cross validation on fold i</i>
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Description

Cross validation on fold i

Usage

```
fit_pred_fold(i, x, y, folds, fit_method, family, non_pen_vars = NULL, ...)
```

Arguments

i	target partition
x	matrix of predictors
y	vector of responses
folds	defines how data is seperated into folds for cross validation
fit_method	model being used to fit the data
family	family used to fit the data
non_pen_vars	index of variables that will not be penalized if glmnet is used
...	additional commmands to glm or cv.glmnet

Value

returns predictions for partition i

Author(s)

Ben Sherwood <ben.sherwood@ku.edu>

Examples

```
folds_10 <- randomly_assign(100,10)
x <- matrix(rnorm(800),ncol=8)
y <- runif(100) < exp(1 + x[,1] + x[,5])/(1+exp(1 + x[,1] + x[,5]))
fold_1_results <- fit_pred_fold(1,x,y,folds_10,"glm","binomial")
fold_2_results <- fit_pred_fold(2,x,y,folds_10,"glm","binomial")
```

randomly_assign	<i>Assigns n samples into k groups</i>
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Description

Assigns n samples into k groups

Usage

```
randomly_assign(n, k)
```

Arguments

n	sample size
k	number of groups

Value

returns a vector of length n with a random assignment of entries from 1 to k

Author(s)

Ben Sherwood <ben.sherwood@ku.edu>

Examples

```
n <- 100
folds_10 <- randomly_assign(n,10)
folds_5 <- randomly_assign(n,5)
```

roccv	<i>roccv: A package for creating ROC plots on cross validated data</i>
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Description

roccv: A package for creating ROC plots on cross validated data

rocplot*Create ROC plot from cross validation results*

Description

Create ROC plot from cross validation results

Usage

```
rocplot(plot_data, ...)
```

Arguments

plot_data	dataframe with columns: response, prediction and method
...	additional commmands plot.roc such as main

Value

returns ROC plot

Author(s)

Ben Sherwood <ben.sherwood@ku.edu>

Examples

```
x <- matrix(rnorm(800),ncol=8)
y <- runif(100) < exp(1 + x[,1] + x[,5])/(1+exp(1 + x[,1] + x[,5]))
cv_results <- cv(x,y=y,method_name="without_formula")
combined_data <- data.frame(y=y,x1=x[,1],x5=x[,5])
gx <- x[,c(2,3,4,6,7,8)]
cvf <- cv(genomic_x=gx,clinical_formula=y~x1+x5,
data=combined_data,method_name="with_form")
total_results <- rbind(cv_results,cvf)
rocplot(total_results,main="rocplot test")
```

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