Package ‘ROCpAI’

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Type Package
Title Receiver Operating Characteristic Partial Area Indexes for evaluating classifiers
Version 1.16.0
BugReports https://github.com/juanpegarcia/ROCpAI/tree/master/issues
Description The package analyzes the Curve ROC, identifies it among different types of Curve ROC and calculates the area under the curve through the method that is most accurate. This package is able to standardize proper and improper pAUC.
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**mcpAUC**

*Classification of area under ROC curve following McClish method*

**Description**

Calculate the area under the ROC curve following McClish methodologic from a dataset and a sample from that dataset.

**Usage**

```r
mcpAUC(
  dataset,
  low.value = NULL,
  up.value = NULL,
  plot = FALSE,
  selection = NULL,
  variable = NULL
)
```

**Arguments**

- **dataset**: Dataframe of the complete information of the samples
- **low.value**: lower false positive rate value that the function will use to calculate the pAUC
- **up.value**: upper false positive rate value that the function will use to calculate the pAUC
- **plot**: ROC plot
- **selection**: vector that will only be used if the parameter "dataset" is a RangedSummarizedExperiment object. This parameter is used to select the variables that will be analysed
- **variable**: in case that dataset is a SummarizedExperiment, indicate the Gold Standard

**Value**

RangedSummarizedExperiment object with the pAUC and the mcpAUC scores, and the TPR and FPR values for each ROC curve generated
**Examples**

```r
library(fission)
data("fission")
resultsMC <- mcpAUC(fission, low.value = 0, up.value = 0.25, plot = TRUE,
                     selection = c("SPNCRNA.1080", "SPAC186.08c"), variable="strain")
```

**Description**

Calculates the confidence interval using a boot analysis

**Usage**

```r
mcpAUCboot(
  dataset,  # dataframe or RangedSummarizedExperiment object
  low.value = NULL,  # lower false positive rate value that the function will use to calculate the pAUC
  up.value = NULL,  # upper false positive rate value that the function will use to calculate the pAUC
  r = 50,  # number of iterations.
  level = 0.95,  # confidence level
  type.interval = "perc",  # String that represent the type of intervals required. The value should be any subset of the values c("norm", "basic", "stud", "perc", "bca") or simply "all" which will compute all five types of intervals.
  selection = NULL,  # vector that will only be used if the parameter "dataset" is a RangedSummarizedExperiment object. This parameter is used to select the variables that will be analysed
  variable = NULL  # in case that dataset is a SummarizedExperiment, indicate the Gold Standard
)
```

**Value**

SummarizedExperiment object with the mcpAUC, the standard desviation, and the lower and upper limits of the confidence interval.
Examples

```r
library(fission)
data("fission")
resultsMCboot <- mcpAUCboot(fission, low.value = 0, up.value = 0.25,
selection = c("SPNCRNA.1080", "SPAC186.08c"), variable="strain")
```

pointsCurve

**Points of the ROC curve**

Description

It calculates the coordinates (fpr, sen) of the ROC curve. This function sorts the scores of a model test and generates the points which will be used to plot its the ROC curve

Usage

```r
pointsCurve(x, y)
```

Arguments

- `x`: It is the vector of the status (gold standar)
- `y`: It is the vector with the values of a predictor variable or clasificator

Value

return a matrix with the points of 1-specificity and sensibility that will be used to generate a ROC curve

Examples

```r
library(fission)
data("fission")
strain <- fission@colData@listData$strain
pointsCurve<- pointsCurve(strain, t(assay(fission))[, "SPNCRNA.1080"])
```

tpAUC

**Tigher partial area under the ROC curve**

Description

It standarizes the partial area under the ROC curve by the tigher index
tpAUCboot

Usage

```r
tpAUC(
  dataset,
  low.value = NULL,
  up.value = NULL,
  plot = FALSE,
  selection = NULL,
  variable = NULL
)
```

Arguments

dataset     Dataframe of the complete information of the samples
low.value   lower false positive rate value that the function will use to calculate the pAUC
up.value    upper false positive rate value that the function will use to calculate the pAUC
plot        ROC plot
selection   vector that will only be used if the parameter "dataset" is a RangedSummarizedExperiment object. This parameter is used to select the variables that will be analysed
variable    in case that dataset is a SummarizedExperiment, indicate the Gold Standard

Value

RangedSummarizedExperiment object with the pAUC and the tpAUC scores, and the TPR and FPR values for each ROC curve generated

Examples

```r
library(fission)
data("fission")
resultsT <- tpAUC(fission, low.value = 0, up.value = 0.25, plot = TRUE,
  selection = c("SPNCRNA.1080", "SPAC186.08c"), variable = "strain")
```

Description

Calculates the confidence interval using a boot analysis
Usage

tpAUCboot(
  dataset,
  low.value = NULL,
  up.value = NULL,
  r = 50,
  level = 0.95,
  type.interval = "perc",
  selection = NULL,
  variable = NULL
)

Arguments

dataset dataframe or RangedSummarizedExperiment object
low.value lower false positive rate value that the function will use to calculate the pAUC
up.value upper false positive rate value that the function will use to calculate the pAUC
r number of iterations.
level confidence level
type.interval String that represent the type of intervals required. The value should be any subset of the values c("norm","basic","stud","perc","bca") or simply "all" which will compute all five types of intervals.
selection vector that will only be used if the parameter "dataset" is a RangedSummarizedExperiment object. This parameter is used to select the variables that will be analysed
variable in case that dataset is a SummarizedExperiment, indicate the Gold Standard

Value

SummarizedExperiment object with the Tp_AUC, the standard deviation, and the lower and upper limits of the confidence interval

Examples

library(fission)
data("fission")
resultstboot<- tpAUCboot(fission,low.value = 0, up.value = 0.25, 
  selection = c("SPNCRNA.1080","SPAC186.08c"), variable="strain")
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