

# Package ‘ROCpAI’

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**Type** Package

**Title** Receiver Operating Characteristic Partial Area Indexes for  
evaluating classifiers

**Version** 1.20.0

**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.

**License** GPL-3

**Encoding** UTF-8

**LazyData** TRUE

**Depends** boot, SummarizedExperiment, fission, knitr, methods

**import** boot, SummarizedExperiment, fission, knitr, methods

**biocViews** Software, StatisticalMethod, Classification

**RoxygenNote** 7.0.2

**VignetteBuilder** knitr

**Suggests** BiocStyle, knitr, rmarkdown

**git\_url** <https://git.bioconductor.org/packages/ROCpAI>

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|--------|-----------------------------------------------------------------------|
| mcpAUC | <i>Clasification of area under ROC curve following McClish method</i> |
|--------|-----------------------------------------------------------------------|

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Description

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

Usage

```
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 RangedSummarized-Experiment 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**

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

mcpAUCboot

*mcpAUCboot***Description**

Calculates the confidence interval using a boot analysis

**Usage**

```
mcpAUCboot(
  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 mcpAUC, the standard deviation, and the lower and upper limits of the confidence interval.

**Examples**

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

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|             |                                |
|-------------|--------------------------------|
| pointsCurve | <i>Points of the ROC curve</i> |
|-------------|--------------------------------|

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**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**

```
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**

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

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|       |                                                |
|-------|------------------------------------------------|
| tpAUC | <i>Tigher partial area under the ROC curve</i> |
|-------|------------------------------------------------|

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**Description**

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

Usage

```
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

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

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|           |                  |
|-----------|------------------|
| tpAUCboot | <i>tpAUCboot</i> |
|-----------|------------------|

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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 objetc                                                                                                                                                              |
| 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 RangedSummarized-Experiment 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 desviation, 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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