Package 'uroc'

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Type Package

Title Computes ROCM, UROC and CPA

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Description The uroc package provides the functionality of creating a ROC movie (ROCM), a universal ROC (uROC) curve and to compute the coefficient of predictive ability (CPA). These tools generalize the classical ROC curve and AUC and can be applied to assess the predictive abilities of features, markers and tests for not only binary classification problems but for just any ordinal or real-valued outcome.

SystemRequirements ImageMagick (https://imagemagick.org/)

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 6.1.1

Imports animation

R topics documented:

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cpa *Computes coefficient of predictive ability (CPA)*

Description

This function computes the coefficient of predictive ability which is equalivalent to the area under the uROC curve. Two syntaxes are possible: one object of class "uroc" or two vectors, the response and the predictor.

Usage

```
cpa(...)

## Default S3 method:
cpa(response, predictor, ...)

## S3 method for class 'uroc'
cpa(uroc, ...)
```

Arguments

...	ignored
response	a numeric vector of real valued responses
predictor	a numeric vector of the same length as response, containing real valued predictions for each observation
uroc	an object of class "uroc" contaning the values of the false alarm rate and the hitrate of the uROC curve

Details

This function is called from rocm and uroc.

Value

The numeric CPA value

Examples

```
data(longley)
response = longley$Employed
predictor = longley$GNP
cpa(response, predictor)
```

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rocm *Builds a ROC movie (ROCM)*

Description

This function computes an animated ROC movie.

Usage

```
rocm(response, predictor, path, output = "animation.gif", clean = TRUE,
  convert = "convert", cmd.fun = if (.Platform$OS.type == "windows")
  shell else system, interval = 0.1, ...)
```

Arguments

response	a numeric vector of real valued responses
predictor	a numeric vector of the same length than response, containing real valued predictions for each observation
path	folder path
output	name of GIF animation
clean	if FALSE png files are not deleted
convert	convert command for the function im.convert
cmd.fun	a function to invoke OS command in im.convert
interval	a postve number to set the time interval of the animation (unit in second) in ani.options
...	plotting arguments

Details

The ROC movie can be used to visualize the performance of a real valued foreacsting problem. Therefore, a sequence of png-files is generated and combined into a GIF animation using the external software ImageMagick (https://imagemagick.org/) and the R package animation.

Value

GIF animation

Examples

```
## Not run:
data(longley)
response = longley$Employed
predictor = longley$GNP
rocm(response, predictor, path="/home")
## End(Not run)
```

---

uroc *Computes a uROC curve*

Description

This function builds a uROC curve and returns a "uroc" object, a list of class "uroc".

Usage

```
uroc(response, predictor, object = FALSE, plot = TRUE, algo = NULL,
  space.size = NULL)
```

Arguments

response	a numeric vector of real valued responses
predictor	a numeric vector of the same length than response, containing real valued predictions for each observation
object	if TRUE an object of type uroc is returned containg the false alarm rate and the hitrate of the uROC curve
plot	plot the uROC curve? if FALSE the curve is not displayed
algo	optional argument to select an algorithm for the computation of the uROC curve. See Details.
space.size	optional argument to set the number of x-values for which the corresponding value in the approximation algorithm for the uROC curve is computed. It is the inverse value of the distance between equidistant points within the interval [0,1]

Details

There are 3 different algorithms available to create a uROC curve. The input argument `algo="exact"` computes the exact uROC curve. Using `algo="approx1"` or `algo="approx2"` generates an approximation to the uROC curve by computing the y-values of the curve only on specific x-values. The x-values are equidistant over the interval [0,1] and the number of x-values used in the computation can be set by `space.size`. Calling `algo="approx1"` generates an approximation with a correction for ties in the predictor vaiable whereas `algo="approx2"` ignores ties in the predictor variable but results in a faster computation. Therefore, it is recommended to either use `algo="exact"` or `algo="approx2"` if the input vector for `predictor` contains a lot of tied values. If the type of algorithm is not specified, the `uroc` function choses one of the three versions based on the input arguments in `response` and `predictor`.

Value

If `object = TRUE` this function returns a list of class "uroc".

Examples

```
data(longley)
response = longley$Employed
predictor = longley$GNP
uroc(response, predictor)
```

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