Package 'uroc'

November 25, 2019

Type Package

Title Computes ROCM, UROC and CPA

Version 0.1.0

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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 7.0.1

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 (1-specificity) and the hitrate (sensitivity) of the UROC curve.

Details

The CPA is an asymmetric measure that is linearly related to the correlation between the classes of the response variable and the ranks of the predictor.

Value

The numeric CPA value.

Examples

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

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rocm *Builds the ROC movie (ROCM) an animated sequence of ROC curves.*

Description

This function computes the sequence of ROC curves which form the ROC Movie and produces a GIF animated ROCM.

Usage

```
rocm(response, predictor, a = NULL, b = NULL, object = TRUE,
  gif = FALSE, movie.name = "animation.gif", ...)
```

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.
a	selects a subset of all ROC curves for the ROC movie with at least a and at most a+b ROC curves.
b	selects a subset of all ROC curves for the ROC movie with at least a and at most a+b ROC curves.
object	if TRUE a list of ROC curves is returned (default object = TRUE).
gif	if TRUE a gif animation is created.
movie.name	name of the movie (with extension).
...	parameters to control the behavior of the GIF animation using the external function ani.option from animation.

Details

The ROC movie can be used to visualize the performance of a real valued foreacsting problem. Therefore, a sequence of ROC curves is generated which can than be combined into a GIF animation. Each entry of the list consist of two vectors of length 1000 containing the values of farate (1-Specificity) and hitrate (sensitivity) and three values, namely the associated auc value, the weight and the threshold.

Value

if object = TRUE, this function returns a list of ROC curves.

Examples

```
## Not run:
data(longley)
response = longley$Employed
predictor = longley$GNP
rocm(response, predictor)
## 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 = "approx", split = 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.
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.
split	a integer value with a default of split = 1. Computes uroc curve by considering only a subset of all N-1 available ROC curves to reduce computation time. The split parameter defines the distance between a set of equidistant indices which are then used to select particular ROC curves among the N-1.

Details

There are 2 different algorithms available to create a UROC curve. The default option is algo="approx" which generates an approximation to the UROC curve by using linear interpolation of each ROC curve. To reduce computation time the paramter split can be specified to select a subset of ROC curves in the computation. The input argument algo="exact" computes the exact UROC curve and should only be used on small data.

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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