

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 7.0.1

Imports animation

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cpa	<i>Computes coefficient of predictive ability (CPA).</i>
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Description

This function computes the coefficient of predictive ability which is equivalent 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" containing 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)
```

plot.uroc	<i>Plot of UROC curve.</i>
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Description

This function plots a UROC curve.

Usage

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

Arguments

x	object of class "uroc"
...	further arguments to plot

Value

plot

rocm	<i>Builds the ROC movie (ROCM) an animated sequence of ROC curves.</i>
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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 = FALSE,
  gif = TRUE,
  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 forecasting problem. Therefore, a sequence of ROC curves is generated which can then 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	<i>Computes a UROC curve.</i>
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Description

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

Usage

```
uroc(response, predictor, approx = FALSE, 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.
approx	Boolean. If TRUE approximates true roc curve with faster algorithm.
split	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

The default option to compute uroc curve generates an approximation to the UROC curve by using linear interpolation of each ROC curve. For small datasets or binary response the exact uroc curve is computed. Setting option approx = TRUE uses a faster approximation algorithm where computation time can be further reduced by setting the parameter split which selects only a subset of ROC curves in the computation.

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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