Package 'intcensROC'

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Type Package

Title AUC Estimation of Interval Censored Survival Data

Version 0.1.3

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Description The kernel of this 'Rcpp' based package is an efficient implementation of the generalized gradient projection method for spline function based constrained maximum likelihood estimator for interval censored survival data (Wu, Yuan; Zhang, Ying. Partially monotone tensor spline estimation of the joint distribution function with bivariate current status data. Ann. Statist. 40, 2012, 1609-1636 <doi:10.1214/12-AOS1016>). The key function computes the density function of the joint distribution of event time and the marker and returns the receiver operating characteristic (ROC) curve for the interval censored survival data as well as area under the curve (AUC).

URL https://gitlab.oit.duke.edu/dcibioinformatics/soft/intcensroc

License GPL (>= 2)

Imports Rcpp (>= 0.12.4), pracma

LinkingTo Rcpp, RcppEigen

Suggests knitr, copula

VignetteBuilder knitr

BuildVignettes yes

NeedsCompilation yes

Repository CRAN

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R topics documented:

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intcensROC-package	*Fast Spline Function Based Constrained Maximum Likelihood Estimator for ROC Estimation of Interval Censored Survival Data*

Description

The kernel of this Rcpp based package is a efficient implementation of the generalized gradient projection method for spline function based constrained maximum likelihood estimator (Wu, Yuan; Zhang, Ying. Partially monotone tensor spline estimation of the joint distribution function with bivariate current status data. Ann. Statist. 40, 2012, 1609-1636 <doi:10.1214/12-AOS1016>). The key function is to compute density function of the joint distribution of event time and the marker. The core function returns the receiver operating characteristic (ROC) curve for the interval censored survival data as well as area under the curve (AUC).

Details

Package:	intcensROC
Type:	Package
Version:	1.0.2
Date:	2020-11-11
License:	GPL-3

Please refer to the individual function documentation or the included vignette for more information. The package vignette serves as a tutorial for using this package. The technical details are provided in the reference cited below.

Author(s)

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References

Wu, Yuan; Zhang, Ying. Partially monotone tensor spline estimation of the joint distribution function with bivariate current status data. Ann. Statist. 40, 2012, 1609-1636 <doi:10.1214/12-AOS1016>

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intcensAUC	*Compute the AUC for ROC curves for Interval Censored Survival Data*

Description

A method to compute area under the curve (AUC) for the receiver operating characteristic (ROC) curve.

Usage

```
intcensAUC(ROCdata)
```

Arguments

ROCdata   A dataframe from the function `intcensROC`

Value

A scalar for AUC.

Examples

```
## example data of ROC curve
U <- runif(100, min = 0.1, max = 5)
V <- runif(100, min = 0.1, max = 5) + U
Marker <- runif(100, min = 5, max = 10)
Delta  <- sample.int(3, size = 100, replace = TRUE)
pTime <- 4

## compute the ROC curve
res <- intcensROC(U, V, Marker, Delta, pTime, gridNumber = 500)
head(res)

##compute the AUC
auc <- intcensAUC(res)
print(auc)
```

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intcensROC   *Compute the ROC curves for Interval Censored Survival Data*

Description

A method to compute the receiver operating characteristic (ROC) curve for the interval censored survival data based on a spline function based constrained maximum likelihood estimator. The maximization process of likelihood is carried out by generalized gradient projection method.

Usage

```
intcensROC(U, V, Marker, Delta, PredictTime, gridNumber = 500)
```

Arguments

U   An array contains left end time points of the observation time range for the interval censored data.

V   An array contains right end time points of the observation time range for the interval censored data.

Marker   An array contains marker levels for the samples.

Delta	An array of indicator for the censored type, use 1, 2, 3 for event happened before the left bound time, within the defined time range, and after.
PredictTime	A scalar indicates the predict time.
gridNumber	A integer for the number of gird for the ROC curve, the default value is 500.

Value

A dataframe with two columes

tp	A array for true positive rate for different marker levels in the range of 0 to 1.
fp	A array for false positive rate for different marker levels in the range of 0 to 1.

References

Wu, Yuan; Zhang, Ying. Partially monotone tensor spline estimation of the joint distribution function with bivariate current status data. Ann. Statist. 40, 2012, 1609-1636 <doi:10.1214/12-AOS1016>

Examples

```
## example data
U <- runif(100, min = 0.1, max = 5)
V <- runif(100, min = 0.1, max = 5) + U
Marker <- runif(100, min = 5, max = 10)
Delta  <- sample.int(3, size = 100, replace = TRUE)
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## compute the ROC curve
res <- intcensROC(U, V, Marker, Delta, pTime, gridNumber = 500)
head(res)
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