Package ‘compareC’

April 26, 2022

Type Package

Title Compare Two Correlated C Indices with Right-Censored Survival Outcome

Version 1.3.2

Date 2022-4-25

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Description Proposed by Harrell, the C index or concordance C, is considered an overall measure of discrimination in survival analysis between a survival outcome that is possibly right censored and a predictive-score variable, which can represent a measured biomarker or a composite-score output from an algorithm that combines multiple biomarkers. This package aims to statistically compare two C indices with right-censored survival outcome, which commonly arise from a paired design and thus resulting two correlated C indices.

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NeedsCompilation yes

Repository CRAN

Date/Publication 2022-04-26 07:30:02 UTC

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compareC

Testing the difference between two correlated overall C indices

Description
This is a function used to test if the difference in two correlated overall C indices is statistically significant.

Usage

compareC(timeX, statusX, scoreY, scoreZ)

Arguments

- timeX: The vector of actual survival time \( X \), one survival time for each observation.
- statusX: The matching vector of event indicator for time \( X \), 1 if occurred and 0 otherwise.
- scoreY: The vector of the first measured biomarker or score \( Y \), one for each of the same observations.
- scoreZ: The vector of the second measured biomarker or score \( Z \), one for each of the same observations.

Value

- est.c: The estimated two C indices.
- est.diff_c: The estimated difference of the two C indices, i.e., \( C_{XY} - C_{XZ} \).
- est.vardiff_c: The estimated variance of the difference of two C indices.
- est.varCxy: The estimated variance of the C index for scoreY.
- est.varCxz: The estimated variance of the C index for scoreZ.
- est.cov: The estimated covariance between the two C indices for scoreY and that for scoreZ.
- zscore: Z score (test statistic) for hypothesis testing.
- pval: P value for the comparison of two C indices.

Note

Under non-random censoring, the returned \( p \)-value is statistically invalid as the assumption of random censoring is violated.

Author(s)
Le Kang, Weijie Chen
References


Pencina MJ and D’Agostino RB. (2004) Overall C as a measure of discrimination in survival analysis: model specific population value and confidence interval estimation. Statistics in Medicine, 23(13), 2109–2123


See Also

estC, vardiffC

Examples

demo(testC)

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**estC**

*Estimation of a single overall C index*

**Description**

This is a function used to estimate a single overall $C$ index.

**Usage**

`estC(timeX, statusX, scoreY)`

**Arguments**

- `timeX`: The vector of actual survival time $X$, one survival time for each observation.
- `statusX`: The matching vector of event indicator for time $X$, 1 if occurred and 0 otherwise.
- `scoreY`: The vector of the measured biomarker $Y$, one for each of the same observations, based on which the $C$ index is to be estimated.

**Value**

The estimated $C$ index.

**Author(s)**

Le Kang, Weijie Chen
References


Pencina MJ and D’Agostino RB. (2004) Overall C as a measure of discrimination in survival analysis: model specific population value and confidence interval estimation. Statistics in Medicine, 23(13), 2109–2123


See Also

vardiffC, compareC

Examples

demo(testC)

vardiffC

Variance estimation of the difference between two correlated overall C indices

Description

This is a function used to estimate the variance of the difference between two correlated overall C indices

Usage

vardiffC(timeX, statusX, scoreY, scoreZ)

Arguments

timeX The vector of actual survival time X, one survival time for each observation
statusX The matching vector of event indicator for time X, 1 if occurred and 0 otherwise
scoreY The vector of the first measured biomarker Y, one for each of the same observations, based on which the variance of the difference in overall C indices is to be estimated
scoreZ The vector of the second measured biomarker Z, one for each of the same observations, based on which the variance of the difference in overall C indices is to be estimated
Value

est.vardiff_c  The estimated variance of the difference of two C indices
est.varCxy    The estimated variance of the C index for scoreY
est.varCxz    The estimated variance of the C index for scoreZ
est.cov       The estimated covariance between the two C indices for scoreY and that for scoreZ

Author(s)

Le Kang, Weijie Chen

References


Pencina MJ and D’Agostino RB. (2004) Overall C as a measure of discrimination in survival analysis: model specific population value and confidence interval estimation. Statistics in Medicine, 23(13), 2109–2123


See Also

estC, compareC

Examples

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