

Package ‘sAUC’

October 4, 2017

Title Semi-parametric Area Under the Curve (AUC) regression

Description In many applications, comparing two groups while adjusting for multiple covariates is desired for the statistical analysis. For instance, in clinical trials, adjusting for covariates is a necessary aspect of the statistical analysis in order to improve the precision of the treatment comparison and to assess effect modification. sAUC is a semi-parametric AUC regression model to compare the effect of two treatment groups in the intended non-normal outcome while adjusting for discrete covariates. More detailed reasons on what it is and why it is proposed are outlined in the paper published in the Journal of Data Science which can be accessed via <https://github.com/sbohora/sAUC/blob/master/docs/articles/bohara-et-al-sauc-paper.pdf>. A major reason behind the development of this method is that this method is computationally simple and is based on closed-form parameter and standard error estimation.

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URL <https://github.com/sbohora/sAUC>

BugReports <https://github.com/sbohora/sAUC/issues>

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LazyData TRUE

Depends R(>= 3.1.0)

Imports Matrix,

stats,
base,
methods,
utils,
DT,
htmltools

Suggests testthat,

testit,
shiny

RoxygenNote 6.0.1.9000

R topics documented:

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calculate_auc	<i>This function calculates different estimates related to AUC</i>
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Description

This function calculates variance of predicted AUC, logit of predicted AUC, and variance of logit of predicted AUC responses passed

Usage

```
calculate_auc(x, y = NULL, data = NULL)
```

Arguments

x	A formula object with two vector responses (For e.g., $y_1 \sim y_2$) or a vector of responses.
y	A vector of responses.
data	An R dataframe object.

Value

A list of AUC estimates.

Author(s)

Som Bohora

Examples

```
calculate_auc(mpg ~ am, data = datasets::mtcars)
calculate_auc(datasets::iris$Sepal.Length, datasets::iris$Petal.Length)
```

`compute_auc`*Compute AUC and its variance*

Description

A function compute to compute AUC and its variance

Usage

```
compute_auc(d, nd)
```

Arguments

d	A vector of response from treatment group
nd	A vector of response from control group

Author(s)

Som Bohora

Examples

```
compute_auc(d = c(0.3,0.2,0.6), nd = c(0.2, 0.9,0.1, 0.5))
```

`compute_inverse`*Compute inverse of a function*

Description

It takes a function and compute its inverse

Usage

```
compute_inverse(x)
```

Arguments

x	A value between 0 and 1
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Author(s)

Som Bohora

Examples

```
compute_inverse(0.6)
```

fasd

FASD data about effects of brochure types on alcohol use

Description

A dataset containing the alcohol use and other attributes.

Usage

```
data(fasd)
```

Format

A data frame with 210 rows and 4 variables:

y alcohol use, number of drinks

group types of brochures

x1 Whether vitamin was taken or not

x2 Smoking status

Source

<http://www.netfas.net/>

Examples

```
data(fasd)
```

run_sAUC_shiny_app

Run Shiny application built for sAUC package

Description

This function allows users to run Shiny application built for sAUC package where users can perform sAUC data analysis and run simulation for one predictor

Usage

```
run_sAUC_shiny_app()
```

Author(s)

Som Bohora

sAUC

Fitting semiparametric AUC regression model adjusting for categorical covariates

Description

sAUC is used to fit semiparametric AUC regression model specified by giving a formula object of response and covariates and a separate argument of treatment group. It will convert variables other than response into factors, estimate model parameters, and display results.

Usage

```
sAUC(formula = FALSE, treatment_group = FALSE, data = FALSE)
```

Arguments

formula	A formula object with response and covariates such as <code>response ~ x1 + x2</code>
treatment_group	A treatment group for which a comparison is to be made
data	A dataframe that contains variables needed for the analysis.

Value

A list of model summary, coefficients, AUC details, and session information.

Author(s)

Som Bohora

Examples

```
ds <- NULL
for (x1 in 0:1){
  for (x2 in 0:2){
    for (x3 in 0:2){
      for (group in 0:1){
        response <- round(rnorm(n = 100, mean = 0, sd = 1),4)
        column <- cbind(x1,x2,x3, group, response)
        ds <- as.data.frame(rbind(ds, column))
      }
    }
  }
}
ds[,c("x1", "x2", "x3", "group")] <- lapply(ds[,c("x1", "x2", "x3", "group")],
                                           function(x) factor(x))

sAUC(formula = response ~ x1 + x2 + x3, treatment_group = "group", data = ds)
```

`simulate_one_predictor`*Simulate Semi-parametric AUC regression adjusting for one categorical predictor*

Description

It asks for number of iterations to be run, number of observations in treatment and control groups for the simulation of Semiparametric AUC regression adjusting for one discrete covariate. In this simulation, true model parameters are as follows: $\beta_0 = 0.15$, $\beta_1 = 0.50$, $\beta_2 = 1$.

Usage

```
simulate_one_predictor(iter = 100, m = 20, p = 30, b0 = 0.15,  
  b1 = 0.5, b2 = 1)
```

Arguments

<code>iter</code>	Number of realizations to be run
<code>m</code>	Number of observations in treatment condition
<code>p</code>	Number of observations in control condition
<code>b0</code>	True intercept value
<code>b1</code>	True beta 1 value
<code>b2</code>	True beta 2 value

Author(s)

Som Bohora

Examples

```
simulate_one_predictor(iter = 200, m = 100, p = 120)
```

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