Package 'metapred'

July 20, 2022

Type Package

Title Metaanalysis of Prediction Models

Version 0.2.0

Author Lauren Gordon

Maintainer Lauren Gordon <lauren.gordon@utoronto.ca>

Description Generates summary statistics for discrimination and calibration of prediction models. Can be used to generate these estimates when the same model is validated in several settings, or to contrast groups of similar models that differ in a key aspect.
Meant for use in systematic reviews of predictive models. Please cite this package if used in an academic publication.
Adapted from Debray TP, Koffijberg H, Nieboer D, Vergouwe Y, Steyerberg EW, Moons KG. Meta-analysis and aggregation of multiple published prediction models. Statistics in medicine. 2014 Jun 30;33(14):2341-62.

License GNU General Public License v3.0

Encoding UTF-8

RoxygenNote 7.2.0

R topics documented:

est_fixedeffect *est_fixedeffect*

Description

Calculates estimate (fixed effects) of the c-statistic for multiple pooled prediction model studies

Usage

```
est_fixedeffect(vec_logitc, vec_SElogitc)
```

Arguments

vec_logitc	Array of logit transformed c-statistics (AUC) of predictive model studies. Calculated in order using the logit function.
vec_SElogitc	Array of standard errors associated with the logit transformed c-statistics (AUC) of each predictive model study. Calculated using the est_SElogitc function.

Value

Pooled estimate of the c-statistic (fixed effects), value from 0 to 1.

est_SEc *est_SEc*

Description

Estimate standard error of the c-statistic

Usage

```
est_SEc(c, num_events, num_non_events)
```

Arguments

c	C-statistic (AUC) of a predictive model, value between 0 and 1
num_events	Number of events in the dataset used to generate the c-statistic
num_non_events	Number of non-events in the dataset used to generate the c-statistic (number of cases - number of events)

Value

Standard error of the c-statistic

`est_SElogitc` *est_SElogitc*

Description

Estimate standard error of the logit of the c-statistic

Usage

```
est_SElogitc(c, num_events, num_non_events)
```

Arguments

`c`	C-statistic (AUC) of a predictive model, value between 0 and 1
`num_events`	Number of events in the dataset used to generate the c-statistic
`num_non_events`	Number of non-events in the dataset used to generate the c-statistic (number of cases - number of events)

Value

Standard error of the logit of the c-statistic

`est_varc` *est_varc*

Description

Estimate variance of the c-statistic based on the sample size and number of events.

Usage

```
est_varc(c, num_events, num_non_events)
```

Arguments

`c`	C-statistic (AUC) of a predictive model, value between 0 and 1
`num_events`	Number of events in the dataset used to generate the c-statistic
`num_non_events`	Number of non-events in the dataset used to generate the c-statistic (number of cases - number of events)

Value

Variance of the c-statistic

est_varlogitc *est_varlogitc*

Description

Estimate variance of the logit of the c-statistic based on the sample size and number of events.

Usage

```
est_varlogitc(c, num_events, num_non_events)
```

Arguments

c	C-statistic (AUC) of a predictive model, value between 0 and 1
num_events	Number of events in the dataset used to generate the c-statistic
num_non_events	Number of non-events in the dataset used to generate the c-statistic (number of cases - number of events)

Value

Variance of the logit of the c-statistic

get_CI *get_CI*

Description

Estimate confidence interval of the the c-statistic.

Usage

```
get_CI(logitc, varlogitc, n, alpha = 0.05)
```

Arguments

logitc	logit of the c-statistic (AUC) of a predictive model, calculated using the logit function
varlogitc	variance of the logit of the c-statistic (AUC) of a predictive model, estimated using est_varlogitc
n	Sample size in the dataset used to generate the c-statistic
alpha	Desired significance level

Value

Confidence interval of the c-statistic

get_CI_high *get_CI_high*

Description

Estimate upper bound of confidence interval of the the c-statistic.

Usage

```
get_CI_high(logitc, varlogitc, n, alpha = 0.05)
```

Arguments

logitc	logit of the c-statistic (AUC) of a predictive model, calculated using the logit function
varlogitc	variance of the logit of the c-statistic (AUC) of a predictive model, estimated using est_varlogitc
n	Sample size in the dataset used to generate the c-statistic
alpha	Desired significance level

Value

Upper bound of confidence interval of the c-statistic

get_CI_low *get_CI_low*

Description

Estimate lower bound of confidence interval of the the c-statistic.

Usage

```
get_CI_low(logitc, varlogitc, n, alpha = 0.05)
```

Arguments

logitc	logit of the c-statistic (AUC) of a predictive model, calculated using the logit function
varlogitc	variance of the logit of the c-statistic (AUC) of a predictive model, estimated using est_varlogitc
n	Sample size in the dataset used to generate the c-statistic
alpha	Desired significance level

Value

Lower bound of confidence interval of the c-statistic

get_CI_vec *get_CI_vec*

Description

Estimate confidence intervals of the the c-statistic for multiple studies at once. Inputs are arrays representing corresponding values for each study.

Usage

```
get_CI_vec(logitc, SElogitc, n, alpha = 0.05)
```

Arguments

logitc	logit of the c-statistic (AUC) of a predictive model, calculated using the logit function
SElogitc	standard error of the logit of the c-statistic (AUC) of a predictive model, estimated using est_SElogitc
n	Sample size in the dataset used to generate the c-statistic
alpha	Desired significance level

Value

Lower bound of confidence interval of the c-statistic

invlogit *invlogit*

Description

Inverse of the logit function

Usage

```
invlogit(logitx)
```

Arguments

x	A continuous value

Value

The inverse logit, a value between 0 and 1

`logit` *logit*

Description

Logit function

Usage

```
logit(x)
```

Arguments

x	A value between 0 and 1

Value

The logit of x

Index