

Package ‘metapred’

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Type Package

Title Metaanalysis of Prediction Models

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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.

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| | |
|-----------------|------------------------|
| est_fixedeffect | <i>est_fixedeffect</i> |
|-----------------|------------------------|

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 | <i>est_SEc</i> |
|---------|----------------|

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

| | |
|-----------------------------|---|
| <code>c</code> | C-statistic (AUC) of a predictive model, value between 0 and 1 |
| <code>num_events</code> | Number of events in the dataset used to generate the c-statistic |
| <code>num_non_events</code> | 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

| | |
|-----------------------------|---|
| <code>c</code> | C-statistic (AUC) of a predictive model, value between 0 and 1 |
| <code>num_events</code> | Number of events in the dataset used to generate the c-statistic |
| <code>num_non_events</code> | 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 | <i>est_varlogitc</i> |
|---------------|----------------------|

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 | <i>get_CI</i> |
|--------|---------------|

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 | <i>logit</i> |
|-------|--------------|

Description

Logit function

Usage

logit(x)

Arguments

x A value between 0 and 1

Value

The logit of x

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