Package ‘LogisticRCI’

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Title Linear and Logistic Regression-Based Reliable Change Index
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      ble Change Index (RCI), to be used with lm and binomial glm model objects, respectively, fol-
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LogisticRCI-package ................................................. 2
RCI ........................................................................... 2
RCI_newpatient .......................................................... 3
RCI_sample_data ...................................................... 5

Index 6
Description

Here we provide an implementation of the linear and logistic regression-based Reliable Change Index (RCI), to be used with `lm` and binomial `glm` model objects, respectively, following Moral et al. <https://psyarxiv.com/gq7az/>. The RCI function returns a score assumed to be approximately normally distributed, which is helpful to detect patients that may present cognitive decline.

Details

**Linear and Logistic Regression-Based Reliable Change Index**

Here we provide an implementation of the linear and logistic regression-based Reliable Change Index (RCI), to be used with `lm` and binomial `glm` model objects, respectively. The RCI function returns a score assumed to be approximately normally distributed, which is helpful to detect patients that may present cognitive decline.

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References


See Also

RCI

Usage

`RCI(model)`
**Arguments**

- **model**: An `lm` or binomial `glm` object.

**Details**

This function takes a fitted model object as input and computes either the linear (for `lm` objects) or logistic (for binomial `glm`) regression-based reliable change index for each observation.

**Value**

The function returns a numeric vector.

**Author(s)**

Rafael A. Moral, Unai Diaz-Orueta and Javier Oltra-Cucarella.

**References**


**Examples**

```r
data(RCI_sample_data)

linear_fit <- lm(score ~ baseline + age + gender + education,
                 data = RCI_sample_data)

logistic_fit <- glm(cbind(score, 15 - score) ~ baseline + age + gender + education,
                     family = binomial,
                     data = RCI_sample_data)

linear_RCI <- RCI(linear_fit)
logistic_RCI <- RCI(logistic_fit)

plot(linear_RCI, logistic_RCI)
```

**RCI_newpatient**

*Calculate the Linear or Logistic Regression-Based Reliable Change Index (RCI) for a New Patient Based on a Fitted Model*

**Description**

This function calculates the RCI for a new patient based on a fitted `lm` or binomial `glm` model object.

**Usage**

```r
RCI_newpatient(model, new)
```
Arguments

model An lm or binomial glm object.
new A data frame with data for the new patient.

Details

This function takes a fitted model object and new patient data as input and computes either the linear (for lm objects) or logistic (for binomial glm) regression-based reliable change index. The names of the variables in the new patient data have to match the names of the predictors and response variable for the fitted model.

Value

The function returns a numeric vector.

Author(s)

Rafael A. Moral, Unai Diaz-Orueta and Javier Oltra-Cucarella.

References


Examples

data(RCI_sample_data)

## fitting models to sample
linear_fit <- lm(score ~ baseline + age + gender + education,
                data = RCI_sample_data)
logistic_fit <- glm(cbind(score, 15 - score) ~ baseline + age + gender + education,
                    family = binomial,
                    data = RCI_sample_data)

## new patient data
new_patient <- data.frame("age" = 68,
                          "gender" = "male",
                          "score" = 9,
                          "baseline" = 11,
                          "education" = 12)

## calculating RCI for new patient without refitting model
RCI_newpatient(model = linear_fit, new = new_patient)
RCI_newpatient(model = logistic_fit, new = new_patient)
**RCI_sample_data**

Sample Data for RCI Calculation

**Description**

This dataset is a simulated sample of 100 patients from a study on cognitive decline.

**Usage**

```r
data("RCI_sample_data")
```

**Format**

A data frame with 100 observations on the following 5 variables:

- `age` The patient’s age.
- `gender` A factor with two levels: "male" or "female".
- `score` The score obtained after 6 months.
- `baseline` The score obtained at the start of the study.
- `education` Number of years of education.

**Examples**

```r
data(RCI_sample_data)
```
Index

* datasets
  RCI_sample_data, 5
* package
  LogisticRCI-package, 2

LogisticRCI (LogisticRCI-package), 2
LogisticRCI-package, 2

RCI, 2, 2
RCI_newpatient, 3
RCI_sample_data, 5