Package 'obs.agree'

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Type Package

Title An R package to assess agreement between observers.

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Description The package includes two functions for measuring agreement. Raw Agreement Indices (RAI) to categorical data and Information-Based Measure of Disagreement (IBMD) to continuous data. It can be used for multiple raters and multiple readings cases.

License GPL (>= 2)

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`obs.agree-package` *Observer agreement package*

Description

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Details

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License:	GPL-2

Author(s)

Teresa Henriques, Luis Antunes and Cristina Costa-Santos

`ctg` *Different clinicians classified cardiotocographic traces based on two guidelines.*

Description

The matrix contains 151 cardiotocographic traces classified by 18 clinicians as Patologic (3), Suspect (2) or Normal (1).

Usage

```
data(ctg)
```

Format

A matrix with 151 observations and the following 18 classifications:

`GL1_E1_01` the classification of the first intern based on the first guideline.

`GL1_E1_02` the classification of the second intern based on the first guideline.

`GL1_E1_03` the classification of the third intern based on the first guideline.

GL1_E2_O1 the classification of the first clinician based on the first guideline.

GL1_E2_O2 the classification of the second clinician based on the first guideline.

GL1_E2_O3 the classification of the third clinician based on the first guideline.

GL1_E3_O1 the classification of the first expert based on the first guideline.

GL1_E3_O2 the classification of the second expert based on the first guideline.

GL1_E3_O3 the classification of the third expert based on the first guideline.

GL2_E1_O1 the classification of the first intern based on the first guideline.

GL2_E1_O2 the classification of the second intern based on the second guideline.

GL2_E1_O3 the classification of the third intern based on the second guideline.

GL2_E2_O1 the classification of the first clinician based on the second guideline.

GL2_E2_O2 the classification of the second clinician based on the second guideline.

GL2_E2_O3 the classification of the third clinician based on the second guideline.

GL2_E3_O1 the classification of the first expert based on the second guideline.

GL2_E3_O2 the classification of the second expert based on the second guideline.

GL2_E3_O3 the classification of the third expert based on the second guideline.

Details

6 interns (E1), 6 clinicians (E2) and 6 experts (E3) classified 151 cardiotocographic traces as Patologic (3), Suspect (2) or Normal (1). Nine of them (3 interns, 3 clinicians and 3 experts) used a guideline (GL1) different from the other nine (GL2).

Source

artificial data

Examples

```
data(ctg)
```

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gymnasts *Performance of 40 gymnasts rated by eigth judges according to two different rulebook*

Description

A data frame containing the score performance of 40 gymnasts, 20 evaluated by eight judges using the old rulebook and 20 by the same judges using the new rulebook

Usage

```
data(gymnasts)
```

Format

A data frame with 40 observations on the following 9 variables:

`Rulebook` a factor with levels New and Old according to which rulebook was used.

`Jude.1` a numeric vector with the ratings of the first judge.

`Jude.2` a numeric vector with the ratings of the second judge.

`Jude.3` a numeric vector with the ratings of the third judge.

`Jude.4` a numeric vector with the ratings of the fourth judge.

`Jude.5` a numeric vector with the ratings of the fifth judge.

`Jude.6` a numeric vector with the ratings of the sixth judge.

`Jude.7` a numeric vector with the ratings of the seventh judge.

`Jude.8` a numeric vector with the ratings of the eighth judge.

Details

Assume that a new rulebook has been recently proposed and subsequently criticized. Consider a random sample of eight judges evaluating a random sample of 20 gymnasts with the old rulebook, and a different random sample of 20 gymnasts with the new rulebook.

Source

artificial data

References

Henriques, T., Antunes, L., Bernardes, J., Matias, M., Sato, D. and Costa-Santos, C. (2013) Information-based measure of disagreement for more than two observers: a useful tool to compare the degree of observer disagreement. *BMC Medical Research Methodology*. **13(1)**:47.

Examples

```
data(gymnasts)
```

IBMD *Information-based measure of disagreement*

Description

Calculates the Information-Based Measure of Disagreement (IBMD) coefficient on a continuous measure.

Usage

```
IBMD(x, conf.levels = 0.95)
```

Arguments

x	n*m matrix or dataframe with n subjects and m observers. If the observer number differ for each subject missing values should be represented by the NA symbol.
conf.levels	confidence level of the interval. Must be a single number between 0 and 1.

Details

The IBMD was proposed (Costa-Santos, 2010) on the basis of Shannon's notion of entropy (Shannon, 1948), described as the average amount of information contained in a variable. In 2013 (Henriques, 2013) was generalized to measure the disagreement among measurements obtained by several observers, allowing different number of observations in each case. It is appropriate for ratio-scale variables with positive values and ranges from 0 (no disagreement) to 1. The confidence interval is estimated using a bootstrap procedure.

Value

A list containing the following components:

Subjects	number of subjects.
Observers	maximum number of observers.
IBMD	the information based measure of disagreement coefficient and the respective confidence interval.

Author(s)

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References

Costa-Santos, C, Antunes, L., Souto, A. and Bernardes, J. (2010) Assessment of disagreement: a new information-based approach. *Ann Epidemiol*, **20(7)**:555-61.

Shannon, C.E. (1948) A mathematical theory of communication. *Bell System Technical Journal*, **27**:379-423 and 623-656.

Henriques, T., Antunes, L., Bernardes, J., Matias, M., Sato, D. and Costa-Santos, C. (2013) Information-based measure of disagreement for more than two observers: a useful tool to compare the degree of observer disagreement. *BMC Medical Research Methodology*. **13(1)**:47.

Carpenter J. and Bithell J. (2000) Bootstrap confidence intervals: when, which, what? A practical guide for medical statisticians. *Stat Med*, **19(9)**:1141-1164.

Examples

```
data(gymnasts)
head(gymnasts)

## Not run:
IBMD(gymnasts[1:20,-1])
IBMD(gymnasts[21:40,-1])
```

```
## End(Not run)
```

RAI *Raw Agreement Indices*

Description

Calculates the proportion of overall and specific agreement.

Usage

```
RAI(x, conf.levels = 0.95)
```

Arguments

x	n*m matrix with n subjects and m observers. If the observer number differ for each subject missing values should be represented by the NA symbol.
conf.levels	confidence level of the interval.Must be a single number between 0 and 1.

Details

The proportions of overall agreement indicates the number of cases in which raters agree exactly, relative to the total number of observations. The proportions of specific agreement calculates observed agreement relative to each rating category individually.

A more detail description of the case of agreement between two raters on dichotomous ratings is presented in (Fleiss,J.L.,2003). The generalized case used is presented by John Uebersax (Uebersax, J., 2009)

Value

Subjects	number of subjects.
Observers	maximum number of observers.
Overall_agreement	the overall proportion of agreement coefficient and the respective confidence interval.
Categories	the categories.
Specific_agreement	the coefficient of proportion of agreement specific to each category and the respectives confidence interval.

Author(s)

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References

Fleiss,J.L., Levin, B. and Paik, M.C. (2003) *Statistical Methods for Rates and Proportions* John Wiley & Sons, Inc, 3rd Edition.

Uebersax, J. (2009) http://www.john-uebersax.com/stat/raw.htm

Examples

```
data(ctg)

## Not run:
RAI(ctg[,1:9])
RAI(ctg[,10:18])
## End(Not run)
```

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