Package 'magree'

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Type Package

Title Implements the O'Connell-Dobson-Schouten Estimators of Agreement for Multiple Observers

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Depends graphics

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Description Implements an interface to the legacy Fortran code from O'Connell and Dobson (1984) <DOI:10.2307/2531148>. Implements Fortran 77 code for the methods developed by Schouten (1982) <DOI:10.1111/j.1467-9574.1982.tb00774.x>. Includes estimates of average agreement for each observer and average agreement for each subject.

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LazyData yes

NeedsCompilation yes

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R topics documented:

`landis` *Landis and Koch dataset.*

Description

Canonical dataset for agreement for multiple observers described in Landis and Koch (Biometrics 1977; 33: 363-374).

Usage

```
data("landis")
```

Format

The format is: int [1:118, 1:7] 4 1 3 4 3 2 1 3 2 1 ... - attr(*, "dimnames")=List of 2 ..$: chr [1:118] "1" "2" "3" "4" ... ..$: chr [1:7] "A" "B" "C" "D" ...

Source

Landis and Koch (Biometrics 1977; 33: 363-374)

Examples

```
data(landis)
## maybe str(landis) ; plot(landis) ...
```

`magree` *O'Connell-Dobson-Schouten estimators for multiobserver agreement.*

Description

Use the O'Connell-Dobson-Schouten estimators of agreement for nominal or ordinal data.

Usage

```
magree(X, weights=c("unweighted","linear","quadratic"), score = NULL)
```

Arguments

X	A matrix or data-frame with observations/subjects as rows and raters as columns.
weights	**"unweighted"** For nominal categories - only perfect agreement is counted. **"linear"** For ordinal categories where disagreement is proportional to the distance between the categories. This is analogous to the agreement weights $w_{i,j} = 1 - \|score[i] - score[j]\|/(max(score) - min(score))$.

"quadratic" For ordinal categories where disagreement is proportional to the square of the distance between the categories. This is analogous to the agreement weights $w_{i,j} = 1 - (score[i] - score[j])^2/(max(score) - min(score))^2$.

`score` The scores that are to be assigned to the categories. Currently, this defaults to a sorted list of the unique values.

Details

The Fortran code from Professor Dianne O'Connell was adapted for R.

The output object is very similar to the Fortan code. Not all of the variance terms are currently used in the `print` and `summary` methods.

Value

`oconnell` object from the `oconnell` function

`schouten` object from the `schouten` function

`call` As per `sys.call()`, to allow for using `update`

See Also

`oconnell`, `schouten`.

Examples

```
## Table 1 (O'Connell and Dobson, 1984)
summary(fit <- magree(landis, weights="unweighted"))
update(fit, weights="linear")
update(fit, weights="quadratic")

## Table 5, O'Connell and Dobson (1984)
magree(landis==1)
magree(landis==2)
magree(landis==3)
magree(landis==4)
magree(landis==5)

## Plot of the marginal distributions
plot(fit)

## Plot of the average agreement by observer
plot(fit, type="kappa by observer")
```

`oconnell` *O'Connell-Dobson estimators for multiobserver agreement.*

Description

Use the O'Connell-Dobson estimator of agreement for nominal or ordinal data. This includes a range of statistics on agreement for assuming either distinct or homogeneous items.

Usage

```
oconnell(X, weights=c("unweighted","linear","quadratic"), i=NULL, score = NULL)
```

Arguments

`X` A matrix or data-frame with observations/subjects as rows and observers as columns.

`weights`
- **"unweighted"** For nominal categories - only perfect agreement is counted.
- **"linear"** For ordinal categories where disagreement is proportional to the distance between the categories. This is analogous to the agreement weights $w_{i,j} = 1 - |score[i] - score[j]|/(max(score) - min(score))$.
- **"quadratic"** For ordinal categories where disagreement is proportional to the square of the distance between the categories. This is analogous to the agreement weights $w_{i,j} = 1 - (score[i] - score[j])^2/(max(score) - min(score))^2$.

`i`
1. For nominal categories - only perfect agreement is counted.
2. For ordinal categories where disagreement is proportional to the distance between the categories. This is analogous to the agreement weights $w_{i,j} = 1 - |score[i] - score[j]|/(max(score) - min(score))$.
3. For ordinal categories where disagreement is proportional to the square of the distance between the categories. This is analogous to the agreement weights $w_{i,j} = 1 - (score[i] - score[j])^2/(max(score) - min(score))^2$.

This argument takes precedence over `weights` if it is specified.

`score` The scores that are to be assigned to the categories. Currently, this defaults to `1:L`, where codeL is the number of categories.

Details

The Fortran code from Professor Dianne O'Connell was adapted for R.

The output object is very similar to the Fortan code. Not all of the variance terms are currently used in the `print`, `summary` and `plot` methods.

Value

`X`	As input
`i`	As input
`nrater`	Number of observers
`nscore`	Number of categories
`nsubj`	Number of subjects
`p1[j,k]`	Probability of observer j giving score k when observers are distinct
`p2[k]`	Probability of score k when observers are homogeneous
`w1[j,k]`	Weighted average of d[] for observer j, score k
`w2[k]`	Weighted average of d[] for score k when observers are homogeneous
`d[j]`	Amount of disagreement for subject j
`s1[j]`	Chance-corrected agreement statistic for subject j when observers are distinct
`s2[j]`	Chance-corrected agreement statistic for subject j when observers are homogeneous; s[j]=1-d[j]/expdel.
`delta[j,k]`	j<k: amount of disagreement expected by change for observers j and k; j>k amount of disagreement expected by chance for observers j and k when observers are homogeneous
`expd1`	Amount of disagreement expected by chance in null case when observers are distinct
`expd2`	Amount of disagreement expected by chance when observers are homogeneous
`dbar`	Average value of d[] over all subjects
`sav1`	Chance-corrected agreement statistic over all subjects when observers are distinct
`sav2`	Chance-corrected agreement statistic over all subjects when observers are homogeneous
`var0s1`	Null variance of S when observers are distinct
`var0s2`	Null variance of S when observers are homogeneous
`vars1`	Unconstrained variance of S when observers are distinct
`vars2`	Unconstrained variance of S when observers are homogeneous
`v0sav1`	Null variance of Sav when observers are distinct
`v0sav2`	Null variance of Sav when observers are homogeneous
`vsav1`	Unconstrained variance of Sav when observers are distinct
`vsav2`	Unconstrained variance of Sav when observers are homogeneous
`p0sav1`	Probability of overall agreement due to chance when observers are distinct
`p0sav2`	Probability of overall agreement due to chance when observers are homogeneous
`resp[i,j]`	Response for observer i on subject j; transpose of X (BEWARE)
`score(i)`	Score associated with i'th category
`call`	As per `sys.call()`, to allow for using `update`

See Also

magree, schouten.

Examples

```
## Table 1 (O'Connell and Dobson, 1984)
summary(fit <- oconnell(landis, weights="unweighted"))
update(fit, weights="linear")
update(fit, weights="quadratic")

## Table 3 (O'Connell and Dobson, 1984)
slideTypeGroups <-
    list(c(2,3,5,26,31,34,42,58,59,67,70,81,103,120),
         c(7,10:13,17,23,30,41,51,55,56,60,65,71,73,76,86,87,105,111,116,119,124),
         c(4,6,24,25,27,29,39,48,68,77,79,94,101,102,117),
         c(9,32,36,44,52,62,84,95),
         c(35,53,69,72),
         c(8,15,18,19,47,64,82,93,98,99,107,110,112,115,121),
         c(1,16,22,49,63,66,78,90,100,113),
         c(28,37,40,61,108,114,118),
         106,
         43,
         83,
         c(54,57,88,91,126),
         c(74,104),
         38,
         46,
         c(89,122),
         c(80,92,96,123),
         85)
data.frame(SlideType=1:18,
           S1=sapply(slideTypeGroups,
                     function(ids) mean(fit$s1[as.character(ids)])),
           S2=sapply(slideTypeGroups,
                     function(ids) mean(fit$s2[as.character(ids)])))

## Table 5, O'Connell and Dobson (1984)
oconnell(landis==1)
oconnell(landis==2)
oconnell(landis==3)
oconnell(landis==4)
oconnell(landis==5)

## Plot of the marginal distributions
plot(fit)
```

---

plot.magree *plot methods for magree, oconnell and schouten objects*

Description

plot methods for magree, oconnell and schouten objects

Usage

```
## S3 method for class 'magree'
plot(x, type = c("p1", "kappa by observer"),
xlab = NULL, ylab = NULL, main = NULL, ...)
## S3 method for class 'oconnell'
plot(x, type = c("p1"), xlab = NULL, ylab = NULL, main = NULL, ...)
## S3 method for class 'schouten'
plot(x, type = c("kappa by observer"), xlab = NULL,
ylab = NULL,
main = NULL, xdelta = 0.1, axes = TRUE, ...)
```

Arguments

x	magree, oconnell or schouten object.
type	Type of plot. For "p1", plot the probabilities by observer. For "kappa by observer", plot the kappas for each observer.
xlab	
ylab	
main	
xdelta	For plot.schouten and "kappa by observer", specifies the width of the brackets for the confidence intervals.
axes	Bool for whether to plot the axes.
...	

Examples

```
fit <- schouten(landis)
plot(fit)
fit <- oconnell(landis)
plot(fit,type="p1")
```

---

print.magree *print methods for magree objects*

Description

print methods for magree objects

Usage

```
## S3 method for class 'magree'
print(x, ...)
## S3 method for class 'oconnell'
print(x, ...)
## S3 method for class 'schouten'
print(x, ...)
```

Arguments

x	the object to print
...	other arguments

Examples

```
print(magree(landis))
```

---

print.summary.magree *print method for summary.magree objects*

Description

print method for summary.magree objects

Usage

```
## S3 method for class 'summary.magree'
print(x, ...)
## S3 method for class 'summary.oconnell'
print(x, ...)
## S3 method for class 'summary.schouten'
print(x, ...)
```

Arguments

x

...

Examples

```
summary(magree(landis))
```

schouten *Schouten estimators for multiobserver agreement.*

Description

Use the Schouten estimator of agreement for nominal or ordinal data. This includes a range of statistics on agreement.

Usage

```
schouten(X, weights=c("unweighted","linear","quadratic","user"), w=NULL,
score=NULL)
```

Arguments

`X` A matrix or data-frame with subjects as rows and observers as columns.

`weights` **"unweighted"** For nominal categories - only perfect agreement is counted.

"linear" For ordinal categories where disagreement is proportional to the distance between the categories. This is analogous to the agreement weights $w_{i,j} = 1 - |i-j|/(c-1)$.

"quadratic" For ordinal categories where disagreement is proportional to the square of the distance between the categories. This is analogous to the agreement weights $w_{i,j} = 1 - (i-j)^2/(c-1)^2$.

"user" An indicator for a user-defined weight matrix. The `weights` argument will be defined as "user" if the `w` argument is specified.

`w` A user-defined weights matrix. This argument takes precedence over `weights` and `score` if it is specified and the `weight` argument will be defined as "user".

`score` A user-defined set of scores for each category. If this is not specified, it is assumed that `score=1:L`, where `L` is the number of categories. This is used with the `weights` argument to define the `w` matrix.

Details

Fortran code was written by Mark Clements based on the algorithms in Schouten (1982).

The output object is closely related to the Fortan code. Not all of the variance terms are currently used in the `print`, `summary` and `plot` methods.

Value

`N` Number of subjects

`M` Number of observers

`L` Number of categories

`data` Re-formatted X

`w` Weight matrix

kab	Kappas between each pair of observers
ka	Average kappas for each observer
kappa	Average kappa
pab,pa,p,ma,qab,qa,q,oab,eab,oa,ea,o,e,wa,wab	Working fields
varkab	Variances for kab
varka	Variances for ka
vark	Variance for the kappa
covkka	Covariance term between the overall average kappa and the average kappas for each observer
chi	Chi-squared statistics comparing the overall average kappa and the average kappa for each observer (df=1 under the null hypothesis)
pchi	P-values that the overall average kappa equals the average kappa for each observer
var0kab	Variance for kab under the null hypothesis
var0ka	Variance for ka under the null hypothesis
var0k	Variance for the overall average kappa under the null hypothesis
p0	P-value for kappa=0
p0a	P-values that the average kappa for a observer equals zero (i.e. ka=0)
weights	As input
X	As input
call	As per sys.call(), to allow for using update

See Also

magree, oconnell.

Examples

```
## Weights matrix used by Schouten (1982)
w <- outer(1:5,1:5,function(x,y) ((x<=2 & y<=2) | (x>=3 & y>=3))+0)
fit <- schouten(landis,w=w) # user-defined weights

summary(fit) # Schouten (1982), Tables 2 and 5

## we can fit the same model with oconnell() or magree() using the score argument
magree(landis,score=c(1,1,2,2,2))

## plot of the average kappas by observer
plot(fit, type="kappa by observer")
```

summary.magree	*summary method for magree objects*

Description

summary method for magree objects

Usage

```
## S3 method for class 'magree'
summary(object, ...)
## S3 method for class 'oconnell'
summary(object, ci.transform = c("logit", "identity"), ci.p = 0.95, ...)
## S3 method for class 'schouten'
summary(object, ci.transform = c("logit", "identity"), ci.p = 0.95, ...)
```

Arguments

`object`	
`ci.transform`	transformation used to calculate the confidence intervals. Either "logit" for a logit transform or "identity" for no transform.
`ci.p`	p value for the confidence interval.
`...`	

Examples

```
summary(magree(landis))
```

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