Package 'RankResponse'

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Type Package

Title Ranking Responses in a Single Response Question or a Multiple Response Question

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Description
Methods for ranking responses of a single response question or a multiple response question

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rank.btmm *Rank responses based on the Bradley-Terry model with the MM method*

Description

Adopt the Bradley-Terry model to rank responses in a single response question or in a multiple response question with the MM method. This method associates each response with a value 'gamma', and use this value to rank responses.

Usage

```
rank.btmm(data)
```

Arguments

data	A m x n matrix dij, where dij = 0 or 1. If the ith respondent selects the jth response, then dij = 1, otherwise dij = 0.

Value

The rank.btmm returns the associated values in the first line and the ranks of the responses in the second line.

Author(s)

Hsiuying Wang <wang@stat.nctu.edu.tw>,Yu-Chun Lin <restart79610@hotmail.com>

References

Hunter DR (2004). MM algorithms for generalized Bradley-Terry models. The Annals of Statistics, 32, 384-406.

See Also

rank.btnr,rank.btqn,rank.L2R,rank.LN,rank.gs,rank.wald

Examples

```
## This is an example to rank three responses in a multiple response question when
## the number of respondents is 1000. In this example, we do not use a real data,
## but generate data in the first three lines.
A <-sample.int(2,1000,replace=TRUE,prob=c(0.37,0.63))-1
B <-sample.int(2,1000,replace=TRUE,prob=c(0.65,0.35))-1
C <-sample.int(2,1000,replace=TRUE,prob=c(0.5,0.5))-1
D <-cbind(A,B,C)
data <-matrix(D,nrow=1000,ncol=3)
## or upload the true data
rank.btmm(data)
```

rank.btnr *Rank responses based on the Bradley-Terry model with Newton-Raphson method*

Description

Adopt the Bradley-Terry model to rank responses in a single response question or in a multiple response question with the Newton-Raphson method. This method associates each response with a value 'gamma', and use this value to rank responses.

Usage

```
rank.btnr(data)
```

Arguments

data	A m x n matrix dij, where dij = 0 or 1. If the ith respondent selects the jth response, then dij = 1, otherwise dij = 0.

Value

The rank.btnr returns the associated values in the first line and the ranks of the responses in the second line.

Author(s)

Hsiuying Wang<wang@stat.nctu.edu.tw>,Yu-Chun Lin<restart79610@hotmail.com>

References

Hunter DR (2004). MM algorithms for generalized Bradley-Terry models. The Annals of Statistics, 32, 384-406.

See Also

rank.btmm,rank.btqn,rank.L2R,rank.LN,rank.gs,rank.wald

Examples

```
## This is an example to rank three responses in a multiple response question when
## the number of respondents is 1000. In this example, we do not use a real data,
## but generate data in the first three lines.
A <-sample.int(2,1000,replace=TRUE,prob=c(0.37,0.63))-1
B <-sample.int(2,1000,replace=TRUE,prob=c(0.65,0.35))-1
C <-sample.int(2,1000,replace=TRUE,prob=c(0.5,0.5))-1
D <-cbind(A,B,C)
data <-matrix(D,nrow=1000,ncol=3)
## or upload the true data
rank.btnr(data)
```

rank.btqn *Rank responses based on the Bradley-Terry model with the quasi-Newton accelerated MM method*

Description

Adopt the Bradley-Terry model to rank responses in a single response question or in a multiple response question with the quasi-Newton accelerated MM method. This method associates each response with a value 'gamma', and use this value to rank responses.

Usage

```
rank.btqn(data)
```

Arguments

data	A m x n matrix dij, where dij = 0 or 1. If the ith respondent selects the jth response, then dij = 1, otherwise dij = 0.

Value

The rank.btqn returns the associated values in the first line and the ranks of the responses in the second line.

Author(s)

Hsiuying Wang<wang@stat.nctu.edu.tw>,Yu-Chun Lin<restart79610@hotmail.com>

References

Hunter DR (2004). MM algorithms for generalized Bradley-Terry models. The Annals of Statistics, 32, 384-406.

See Also

rank.btmm,rank.btnr,rank.L2R,rank.LN,rank.gs,rank.wald

Examples

```
## This is an example to rank three responses in a multiple response question when
## the number of respondents is 1000. In this example, we do not use a real data,
## but generate data in the first three lines.
A <-sample.int(2,1000,replace=TRUE,prob=c(0.37,0.63))-1
B <-sample.int(2,1000,replace=TRUE,prob=c(0.65,0.35))-1
C <-sample.int(2,1000,replace=TRUE,prob=c(0.5,0.5))-1
D <-cbind(A,B,C)
data <-matrix(D,nrow=1000,ncol=3)
## or upload the true data
rank.btqn(data)
```

rank.gs *Rank responses based on the Generalized score test*

Description

Rank responses of a single response question or a multiple response question by the generalized score test procedure.

Usage

```
rank.gs(data, alpha, type=2)
```

Arguments

data	A m x n matrix dij, where dij = 0 or 1. If the ith respondent selects the jth response, then dij = 1, otherwise dij = 0.
alpha	The significance level used in the Generalized score test.
type	type=1 for a single response question ;type=2 for a multiple response question .

Value

The rank.gs returns the estimated probabilities of the responses being selected and the ranks of the responses by the Generalized score procedure.

Author(s)

Hsiuying Wang<wang@stat.nctu.edu.tw>,Yu-Chun Lin<restart79610@hotmail.com>

References

Wang, H. (2008). Ranking Responses in Multiple-Choice Questions. Journal of Applied Statistics, 35, 465-474.

See Also

rank.btmm,rank.btnr,rank.btqn,rank.L2R,rank.LN,rank.wald

Examples

```
## This is an example to rank three responses in a multiple response question when
## the number of respondents is 1000 and the significance level is 0.05. In this
##example,we do not use a real data, but generate data in the first three lines.
A <-sample.int(2,1000,replace=TRUE,prob=c(0.21,0.79))-1
B <-sample.int(2,1000,replace=TRUE,prob=c(0.81,0.19))-1
C <-sample.int(2,1000,replace=TRUE,prob=c(0.62,0.28))-1
D <-cbind(A,B,C)
data <-matrix(D,nrow=1000,ncol=3)
## or upload the true data
```

```
alpha<-0.05
rank.gs(data,alpha,2)
```

`rank.L2R` *Rank responses under the Bayesian framework according to the loss function in Method 3 of Wang and Huang (2004).*

Description

Rank responses of a single response question or a multiple response question under the Bayesian framework according to the loss function in Method 3 of Wang and Huang (2004).

Usage

```
rank.L2R(data,response.number,prior.parameter,e)
```

Arguments

`data`	A m x n matrix dij, where dij = 0 or 1. If the ith respondent selects the jth response, then dij = 1, otherwise dij = 0.
`response.number`	The number of the responses.
`prior.parameter`	The parameter vector of the Dirichlet prior distribution, where the vector dimension is 2^response.number.
`e`	A cut point used in the loss function which depends on the economic costs.

Value

The rank.L2R returns the estimated probabilities of the responses being selected in the first line and the ranks of the responses in the second line.

Author(s)

Hsiuying Wang<wang@stat.nctu.edu.tw>,Yu-Chun Lin<restart79610@hotmail.com>

References

Wang, H. and Huang, W. H. (2014). Bayesian Ranking Responses in Multiple Response Questions. Journal of the Royal Statistical Society: Series A (Statistics in Society), 177, 191-208.

See Also

`rank.btmm`,`rank.btnr`,`rank.btqn`,`rank.LN`,`rank.gs`,`rank.wald`

Examples

```
## This is an example to rank three responses in a multiple response
## question when the number of respondents is 1000 and the value e
## is 0.15. In this example, we do not use a real data, but generate
## data in the first three lines.
A <-sample.int(2,1000,replace=TRUE,prob=c(0.37,0.63))-1
B <-sample.int(2,1000,replace=TRUE,prob=c(0.71,0.29))-1
C <-sample.int(2,1000,replace=TRUE,prob=c(0.22,0.78))-1
D <-cbind(A,B,C)
data <-matrix(D,nrow=1000,ncol=3)
## or upload the true data
response.number <-3
prior.parameter <- c(5,98,63,7,42,7,7,7)
e <- 0.15
rank.L2R(data,response.number,prior.parameter,e)
```

`rank.LN` *Rank responses under the Bayesian framework according to the loss function in Method 1 of Wang and Huang (2004).*

Description

Rank responses of a single response question or a multiple response question under the Bayesian framework according to the loss function in Method 1 of Wang and Huang (2004).

Usage

```
rank.LN(data,response.number,prior.parameter,c)
```

Arguments

`data`	A m x n matrix dij, where dij = 0 or 1. If the ith respondent selects the jth response, then dij = 1, otherwise dij = 0.
`response.number`	The number of the responses.
`prior.parameter`	The parameter vector of the Dirichlet prior distribution, where the vector dimension is 2^response.number.
`c`	The value of c in the loss function

Value

The rank.LN returns the estimated probabilities of the responses being selected in the first line and the ranks of the responses in the second line.

Author(s)

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References

Wang, H. and Huang, W. H. (2014). Bayesian Ranking Responses in Multiple Response Questions. Journal of the Royal Statistical Society: Series A (Statistics in Society), 177, 191-208.

See Also

rank.btmm,rank.btnr,rank.btqn,rank.L2R,rank.gs,rank.wald

Examples

```
## This is an example to rank three responses in a multiple response
## question when the number of respondents is 1000 and the value e2R
## is 0.15. In this example, we do not use a real data, but generate
## data in the first three lines.
A <-sample.int(2,1000,replace=TRUE,prob=c(0.37,0.63))-1
B <-sample.int(2,1000,replace=TRUE,prob=c(0.71,0.29))-1
C <-sample.int(2,1000,replace=TRUE,prob=c(0.22,0.78))-1
D <-cbind(A,B,C)
data <-matrix(D,nrow=1000,ncol=3)
## or upload the true data
response.number <-3
prior.parameter <- c(5,98,63,7,42,7,7,7)
c <- 0.05
rank.LN(data,response.number,prior.parameter,c)
```

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rank.wald *Rank responses based on the Wald test*

Description

Rank responses of a single response question or a multiple response question by the Wald test procedure.

Usage

```
rank.wald(data, alpha, type=2)
```

Arguments

data	A m x n matrix dij, where dij = 0 or 1. If the ith respondent selects the jth response, then dij = 1, otherwise dij = 0.
alpha	The significance level used in the Wald test.
type	type=1 for a single response question ;type=2 for a multiple response question .

Value

The rank.wald returns the estimated probabilities of the responses being selected and the ranks of the responses by the Wald trest procedure.

Author(s)

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References

Wang, H. (2008). Ranking Responses in Multiple-Choice Questions. Journal of Applied Statistics, 35, 465-474.

See Also

rank.btmm,rank.btnr,rank.btqn,rank.L2R,rank.LN,rank.gs

Examples

```
## This is an example to rank three responses in a multiple response question when
## the number of respondents is 1000 and the significance level is 0.05. In this
## example,we do not use a real data, but generate data in the first three lines.
A <-sample.int(2,1000,replace=TRUE,prob=c(0.21,0.79))-1
B <-sample.int(2,1000,replace=TRUE,prob=c(0.81,0.19))-1
C <-sample.int(2,1000,replace=TRUE,prob=c(0.62,0.28))-1
D <-cbind(A,B,C)
data <-matrix(D,nrow=1000,ncol=3)
## or upload the true data
alpha<-0.05
rank.wald(data,alpha,2)
```

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