Package 'bspam'

January 31, 2024

Type Package

Encoding UTF-8

Title Speed-Accuracy Psychometric Modeling for Binomial Count Outcome Data with R

Version 1.2.2

Maintainer Akihito Kamata <akamata@gmail.com>

Description This is an R package that contains functions to fit the speed-accuracy psychometric model for count outcome data (Potgieter, Kamata & Kara, 2017; Kara, Kamata, Potgieter & Nese, 2020), where the accuracy is modeled by a binomial count latent variable model. For example, the use of this modeling technique allows model-based calibration and scoring for oral reading fluency (ORF) assessment data.

License GPL (>= 3)

Depends R (>= 3.5.0)

Imports tibble, rootSolve, tidyverse, tidyr, magrittr, doParallel, foreach, futile.logger, mvtnorm, nleqslv, tryCatchLog, parallel, miscTools, psych

Suggests rjags, rstan, testthat (>= 3.5.0)

URL https://github.com/kamataak/bspam

BugReports https://github.com/kamataak/bspam/issues

RoxygenNote 7.2.3

LazyData yes

Config/testthat/edition 3

NeedsCompilation no

Author Akihito Kamata [aut, cre] (<https://orcid.org/0000-0001-9570-1464>),
Cornelis J. Potgieter [aut] (<https://orcid.org/0000-0002-1995-6817>),
Joseph F. T. Nese [aut] (<https://orcid.org/0000-0002-9878-7395>),
Yusuf Kara [aut] (<https://orcid.org/0000-0003-0691-0630>),
Sarunya Somsong [aut] (<https://orcid.org/0000-0002-4974-7346>),
Xin Qiao [aut] (<https://orcid.org/0000-0002-3248-7859>),
Kuo Wang [aut] (<https://orcid.org/0000-0002-4925-0591>)

R topics documented:

bspam–package	*bspam : A package for fitting the speed-accuracy psychometric model for repeatedly measured count outcome data.*

Description

Purpose of this package

'bspam' is an R package that contains functions to fit the speed-accuracy psychometric model for count outcome data (Potgieter, Kamata & Kara, 2017; Kara, Kamata, Potgieter & Nese, 2020), where the accuracy is modeled by a binomial count latent variable model. For example, the use of this modeling technique allows model-based calibration and scoring for oral reading fluency (ORF) assessment data.

Design philosophy

Write Design philosophy

Author(s)

Akihito Kamata <akamata@smu.edu>

Cornelis J. Potgieter <c.potgieter@tcu.edu>

Joseph F. T. Nese <jnese@uoregon.edu>

Yusuf Kara <ykara@mail.smu.edu>

Sarunya Somsong <sarunya.ss@hotmail.com>

Xin Qiao <xqiao@usf.edu>

Kuo Wang <wangkuo@nifty.com>

bayes	*Bayes function when running mcem with bayes setting*

Description

Bayes function when running mcem with bayes setting

Usage

```
bayes(
  person.data = NA,
  person.id = "",
  task.id = "",
  max.counts = "",
  obs.counts = "",
  time = "",
  parallel = T,
  n.chains = NA,
  thin = 1,
  iter = NA,
  burn = NA
)
```

Arguments

person.data	- student reading data
person.id	The column name in the data that represents the unique individual identifier.
task.id	The column name in the data that represents the unique task identifier.
max.counts	The column name in the data that represents the number of words in a task.
obs.counts	The column name in the data that represents the words read correctly for each case.
time	The column name in the data that represents the time, in seconds, for each case.
parallel	parallel=T, #logical, run in parallel? "T" or "F"
n.chains	int., number of the chains
thin	int, thinning interval, a.k.a, period of saving samples
iter	int., number of the iterations after the burn-in period
burn	int., number of the burn-in iterations

Value

list

---

bayes.wcpm   *Bayes function when running mcem with bayes setting*

Description

Bayes function when running mcem with bayes setting

Usage

```
bayes.wcpm(
  calib.data = NA,
  person.data = NA,
  person.id = NULL,
  task.id = NULL,
  occasion = NULL,
  group = NULL,
  max.counts = NULL,
  obs.counts = NULL,
  time = NULL,
  cases = NULL,
  external = NULL,
  type = NULL,
  parallel = T,
  n.chains = NA,
  iter = NA,
  burn = NA,
  thin = 1
)
```

Arguments

`calib.data`	- fit.model class object
`person.data`	- individual reading data
`person.id`	The column name in the data that represents the unique individual identifier.
`task.id`	The column name in the data that represents the unique task identifier.
`occasion`	The column name in the data that represents the unique occasion.
`group`	The column name in the data that represents the unique group.
`max.counts`	The column name in the data that represents the number of words in a task.
`obs.counts`	The column name in the data that represents the words read correctly for each case.
`time`	The column name in the data that represents the time, in seconds, for each case.
`cases`	- student id vectors, will directly use passage data if no calib.data provided
`external`	- if not NULL, will use not student read passages for estimating
`type`	- output type, "general" and "orf", default "general" only output tau & theta. "orf" will output wcpm
`parallel`	parallel=T, #logical, run in parallel? "T" or "F"
`n.chains`	int., number of the chains

iter	int., number of the iterations after the burn-in period
burn	int., number of the burn-in iteration
thin	int, thinning interval, a.k.a, period of saving samples

Value

list

---

fit.model   *Estimate the model parameters*

Description

This is an interface function to estimate the model parameters based on the task-level (i.e., passage-level in ORF assessment context) accuracy and speed data by implementing the Monte Carlo EM algorithm described in Potgieter et al. (2017) or fully Bayesian method described in Kara et al. (2020).

Usage

```
fit.model(
  data = NA,
  person.data = NA,
  person.id = "",
  task.id = "",
  max.counts = "",
  obs.counts = "",
  time = "",
  k.in = 5,
  reps.in = 2,
  ests.in = NA,
  est = "mcem",
  se = "none",
  verbose = FALSE
)
```

Arguments

data	A data frame. A wide-format response data generated by the `prep` function. If this argument is used, the next 6 arguments `person.data`, `person.id`, `task.id`,`max.counts`, `obs.counts`, `time` should be skipped.
person.data	A data frame. A long-format response data object. If this this argument is used, the previous argument `data` should be skipped.
person.id	Quoted variable name in `person.data` that indicates the unique person identifier.
task.id	Quoted variable name in `person.data` that indicates the unique task identifier. In the ORF assessment context, it is the passage identifier.
max.counts	Quoted variable name in `person.data` that indicates the number of attempts in the task. In the ORF assessment context, it is the number of words in the passage.

obs.counts	Quoted variable name in person.data that indicates the number of successful attempts in each task. In the ORF assessment context, it is the number of words read correctly for the passage.
time	Quoted variable name in person.data that indicates the time in seconds took to complete the task. In the ORF context, it is the time took to complete reading the passage.
k.in	Numeric, indicating the number of imputations. Default is 5.
reps.in	Numeric, indicating the number of Monte-Carlo iterations. Default is 2.
ests.in	An optional list of numeric vectors, indicating initial values of the model parameters. If this argument is not given, mom function will be called to generate the initial values.
est	Quoted string, indicating the choice of the estimator. It has to be one of "mcem", "bayes". Default is "mcem".
se	Quoted string, indicating the choice of the standard errors. It has to be one of "none", "analytic", "bootstrap". Default is "none".
verbose	Boolean. If TRUE, the summary will be output. Default is FALSE.

Details

Additional details...

Value

MCEM list, bayes list

Note

More & more additional note...

References

Potgieter, N., Kamata, A., & Kara, Y. (2017). An EM algorithm for estimating an oral reading speed and accuracy model. Manuscript submitted for publication.

Kara, Y., Kamata, A., Potgieter, C., & Nese, J. F. (2020). Estimating model-based oral reading fluency: A bayesian approach with a binomial-lognormal joint latent model. Educational and Psychological Measurement, 1–25.

See Also

scoring for scoring.

Examples

```
# example code
MCEM_run <- fit.model(person.data = passage2,
                      person.id = "id.student",
                      task.id = "id.passage",
                      max.counts = "numwords.pass",
                      obs.counts = "wrc",
                      time = "sec",
                      k.in = 5,
                      reps.in = 50,
```

```
                            est = "mcem")
```

---

fit.model.testlet	*This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. A copy of the GNU General Public License is available at http://www.gnu.org/licenses/*

Description

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. A copy of the GNU General Public License is available at http://www.gnu.org/licenses/

Usage

```
fit.model.testlet(
  data = NULL,
  person.id = "",
  sub.task.id = "",
  obs.count = "",
  time = "",
  task.id = "",
  max.counts = ""
)
```

Arguments

data	A data frame. It has the information of student, passage, sentence, obs.count and time.
person.id	each student's id.
sub.task.id	each sentence's id.
obs.count	The column name in the data that represents the words read correctly for each sentence
time	The column name in the data that represents the reading time for the sentence.
task.id	The column name in the data that represents the unique passage identifier.
max.counts	The column name in the data that represents the number of words in a sentence.

Details

Additional details...

Value

list

Note

Additional note...

Examples

```
# example code
fit.model.testlet <- function(data=NULL, person.id="", sub.task.id="",obs.count="", time="", task.id="", max.
```

---

get.cases *Returns cases (person and occasion) applied in [fit.model] function.*

Description

Returns cases (person and occasion) applied in [fit.model] function.

Usage

```
get.cases(data)
```

Arguments

data = person response data

Value

cases vector

---

get.perfectcases *Returns perfect cases*

Description

This is a utility function that returns a list of perfect cases for which all responses were correct for all assigned tasks.

Usage

```
get.perfectcases(data)
```

Arguments

data A data frame. A wide-format response data generated by the prep function.

Value

A vector of perfectly accurate cases.

---

getBootstrapSE *Get bootstrap SE case is a single stu_season_id*

Description

Added MAP function 07/14/2021 Modified a bug of MLE 07/23/2021 Modified EAP 10/28/2021

Usage

```
getBootstrapSE(
  object,
  person.data,
  case = NA,
  perfect.cases,
  est = "map",
  kappa = 1,
  bootstrap = 100,
  external = NULL
)
```

Arguments

`object`	- mcem class object
`person.data`	- individual response data
`case`	- case number
`perfect.cases`	- perfect accurate case
`est`	- SE type.(MLE, EAP, and MAP.) default MAP
`kappa`	- Default kappa = 1, better be 5
`bootstrap`	- K number of bootstrap, default is 100
`external`	- if not NULL, will use unread task for estimating

Value

SE dataset

---

get_errlist *To get a string of error passages that have no at least two readers*

Description

To get a string of error passages that have no at least two readers

Usage

```
get_errlist(passage)
```

Arguments

passage

Value

a string of error passages

---

log.initiating   *This file includes the log functions of bspam package.*

Description

Copyright (C) 2021-2023 The ORF Project Team

Usage

```
## S3 method for class 'initiating'
log()
```

Details

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. A copy of the GNU General Public License is available at http://www.gnu.org/licenses/

This is log.initiating function, which is used to log output.

MCEM   *Passage calibration data set*

Description

Passage calibration data set

Usage

```
MCEM
```

Format

An object of class mcem of length 2.

---

passage.calib.bayes   *Passage calibration data with bayes*

Description

A data set calibrated with bayes.

Usage

```
passage.calib.bayes
```

Format

two lists: $pass.param with 150 rows and $hyper.param with 4 variables

$pass.param

a parameter controlling binomial success probabilities

b parameter controlling binomial success probabilities

alpha parameter controlling reading times

beta parameter controlling reading times

se_a standard error of a

se_b standard error of b

se_alpha standard error of alpha

se_beta standard error of beta

passage.id passage ID

nwords.p the total

$hyper.param

vartau variance of latent reading ability tau

rho correlation between two latent variables

se_vartau standard error of vartar

se_rho standard error of rho

Source

<https://jnese.github.io/core-blog/>

passage.calib.mcem	*Passage calibration data with MCEM*

Description

A data set calibrated with MCEM.

Usage

```
passage.calib.mcem
```

Format

two lists: $pass.param with 150 rows and $hyper.param with 4 variables

$pass.param

a parameter controlling binomial success probabilities

b parameter controlling binomial success probabilities

alpha parameter controlling reading times

beta parameter controlling reading times

se_a standard error of a

se_b standard error of b

se_alpha standard error of alpha

se_beta standard error of beta

passage.id passage ID

nwords.p the total

$hyper.param

vartau variance of latent reading ability tau

rho correlation between two latent variables

se_vartau standard error of vartar

se_rho standard error of rho

Source

<https://jnese.github.io/core-blog/>

---

passage2 *Passage-level student data set*

Description

A data set consisted of reading accuracy and time data for 12 passages from 85 students.

Usage

```
passage2
```

Format

847 rows and 7 variables:

id.student unique student identifier

occasion identifier for longitudinal assessment occasions; here a triannual assessment administered in the fall, winter, and spring of a school year

grade student grade level

id.passage unique passage identifier

numwords.pass total number of words in the passage

wrc words read correct

sec seconds to read the passage

Source

<https://jnese.github.io/core-blog/>

---

plot.mcem *Plot function to show graph of mcem class*

Description

Copyright (C) 2021-2023 The ORF Project Team

Usage

```
## S3 method for class 'mcem'
plot(object, X)
```

Arguments

```
object          = mcem object
X               = dataset to plot
...             = parameter
```

Details

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. A copy of the GNU General Public License is available at http://www.gnu.org/licenses/

---

prep   *This file includes utilities of bspam package.*

Description

Copyright (C) 2021-2023 The ORF Project Team

Usage

```
prep(
  data = data,
  person.id = "",
  task.id = "",
  occasion = "",
  group = "",
  max.counts = "",
  obs.counts = "",
  time = ""
)
```

Arguments

data   = student response data

Details

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. A copy of the GNU General Public License is available at http://www.gnu.org/licenses/

prep function prepares input data for fit.model function

Value

data list (data.long: data frame, data.wide: list of Y, logT10, N, I)

---

preplong	*Prepares data in a long format for [wcpm]*

Description

Prepares data in a long format for [wcpm]

Usage

```
preplong(
  data,
  person.id = "",
  task.id = "",
  occasion = "",
  group = "",
  max.counts = "",
  obs.counts = "",
  time = ""
)
```

Arguments

data	= person response data

Value

data frame

---

prepwide	*Prepares data in a wide format for [mcem].*

Description

This function will return a list with 5 elements: Y: a matrix of words read correctly, where rows represent cases (student and occasion) and columns represent passages logt10: a [tibble::tibble()] of words read correctly N: the number of cases per passage I: the number of passages

Usage

```
prepwide(data, person.id, task.id, max.counts, obs.counts, time)
```

Arguments

data	A data frame.
time	The column name in the data that represents the time, in seconds, for each case.
studentid	The column name in the data that represents the unique student identifier.
passageid	The column name in the data that represents the unique passage identifier.
numwords.p	The column name in the data that represents the number of words in a passage.
wrc	The column name in the data that represents the words read correctly for each case.

---

run.mcem   *This file includes the Base functions of bspam package.*

Description

Copyright (C) 2021-2023 The ORF Project Team

Usage

```
run.mcem(Y, logT10, N, I, k.in = 5, reps.in = 2, ests.in = NA, verbose = FALSE)
```

Arguments

Y	= n x I matrix of reading scores – missingness allowed
logT10	= n x I matrix of log10(reading times) – missingness allowed
N	= vector of passage lengths
I	= number of passages
k.in	= number of imputations, default is 5
reps.in	= number of Monte-Carlo iterations, default is 2
ests.in	= if not give, mom function will be called and get est.in output
verbose	- boolean, if shows the summary, default is FALSE

Details

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. A copy of the GNU General Public License is available at http://www.gnu.org/licenses/

This is run.mcem function. Update Memo: 04/29/2021 Modified the mcem function based on Nelis's updated. 10/28/2021 Modified the mcem output

Value

mcem list a,b = parameters controlling binomial success probabilities, each length I alpha,beta = parameters controlling reading times, each length I var_tau = variance of latent reading ability tau rho = correlation between two latent variables

---

run.scoring *This is run.scoring function.*

Description

Update Memo: 04/29/2021 Modified the wcpm function based on Nelis's updated. 06/01/2021 Modified based on Nelis's MAP function. 06/01/2021 Modified based on Sarunya's BiEAP function. 06/20/2021 Modified based on Nelis's updated for MLE and EAP 06/21/2021 Modified a bug of MAP function. 07/12/2021 Modified est.eqs function based on Nelis's code. 07/13/2021 Added Map function for bootstrap. 07/30/2021 Modified wcpm function based on Sarunya's update

Usage

```
run.scoring(
  object,
  person.data,
  task.data,
  cases,
  perfect.cases,
  est = "map",
  lo = -4,
  hi = 4,
  q = 100,
  kappa = 1,
  external = NULL,
  type = NULL
)
```

Arguments

`object`	= fit.model object, if not be given will occur error and stop running
`person.data`	= individual response task data
`task.data`	= estimate parameters data
`cases`	= individual occasion id vector
`perfect.cases`	= perfect accurate case
`est`	= estimator, c("mle", "map", "eap", "bayes"), default "map"
`lo`	= default -4
`hi`	= default 4
`q`	= default 100
`kappa`	= default 1
`external`	= if not NULL, will use not student read passages for estimating
`type`	- output type, "general" and "orf", default "general" only output tau & theta. "orf" will output wcpm

Value

wcpm list

---

scoring   *Estimate factor scores with task-level model*

Description

This is an interface function to estimated factor scores based on the task-level (i.e., passage-level in ORF assessment context) accuracy and speed data. It implements likelihood-based approaches (MLE, MAP, or EAP) described in Qiao et al. (under review) or fully Bayesian method described in Kara et al. (2020).

Usage

```
scoring(
  calib.data = NA,
  person.data = NA,
  person.id = "",
  task.id = "",
  occasion = "",
  group = "",
  max.counts = "",
  obs.counts = "",
  time = "",
  cases = NULL,
  est = "map",
  se = "analytic",
  failsafe = 0,
  bootstrap = 100,
  external = NULL,
  type = "general"
)
```

Arguments

`calib.data`	A class object. Output from calibration phase by [`fit.model`](fit.model) function
`person.data`	A data frame. A long-format response data object.
`person.id`	Quoted variable name in `person.data` that indicates the unique individual identifier.
`task.id`	Quoted variable name in `person.data` that represents the unique task identifier. In the ORF assessment context, it is the passage identifier.
`occasion`	The column name in the data that represents the unique occasion.
`group`	The column name in the data that represents the unique group.
`max.counts`	Quoted variable name in `person.data` that represents the number of attempts in the task. In the ORF assessment context, it is the number of words in the passage.
`obs.counts`	The column name in the data that represents the words read correctly for each case.
`time`	The column name in the data that represents the time, in seconds, for each case.
`cases`	A vector of individual id for which scoring is desired. If no information is is specified, it will estimate scores for all cases in the `person.data`.

est	Quoted string, indicating the choice of the estimator. It has to be one of code/"mle", "map", "eap", "bayes". Default is "map".
se	Quoted string, indication the choice of the standard errors. It has to be one of code/"analytic", "bootstrap". Default is "analytic".
failsafe	Numeric, indicating the number of retries for bootstrap, which can be set between 0 and 50. Default is 0.
external	An optional vector of task ID's in strings. If NULL (default), the wcpm scores are derived with the tasks the individuals were assigned to. If not NULL, wcpm scores are derived with the tasks provided in the vector, rather than the tasks the individuals were assigned.
type	Quoted string, indication of the choice of output. If "general" (default), wcpm scores are not reported. If "orf", wcpm scores will be reported.
bootstrp	Numeric, indicating the number of bootstrap iterations. Default is 100.

Details

Additional details...

Value

scoring list or Bootstrap dataset

Note

More additional note...

References

Qiao, X, Potgieter, N., & Kamata, A. (2023). Likelihood Estimation of Model-based Oral Reading Fluency. Manuscript submitted for publication.

Kara, Y., Kamata, A., Potgieter, C., & Nese, J. F. (2020). Estimating model-based oral reading fluency: A bayesian approach with a binomial-lognormal joint latent model. Educational and Psychological Measurement, 1–25.

See Also

[fit.model](#) for model parameter estimation.

Examples

```
# example code
WCPM_all <- scoring(calib.data=MCEM_run,
                  person.data = passage2,
                  person.id = "id.student",
                  occasion = "occasion",
                  group = "grade",
                  task.id = "id.passage",
                  max.counts = "numwords.pass",
                  obs.counts = "wrc",
                  time = "sec",
                  est = "map",
                  se = "analytic",
                  type="general")
```

---

sentence.data   *Sentence-level student data set*

Description

A data set consisted of reading time data for 4 passages and 23 sentences from 58 students.

Usage

```
sentence.data
```

Format

1334 rows and 8 variables:

id.student unique student identifier

grade student grade level

id.passage unique passage identifier

ind.passage passage index

id.sentence sentence identifier

numwords.sent total number of words in the sentence

wrc words read correct

sec seconds to read the sentence

Source

https://jnese.github.io/core-blog/

---

summary.bootstrap   *summary the information of bootstrap class*

Description

Copyright (C) 2021-2023 The ORF Project Team

Usage

```
## S3 method for class 'bootstrap'
summary(
  object,
  digits = 4,
  geterror = FALSE,
  verbose = TRUE,
  factor.scores = FALSE
)
```

Arguments

`object`	= bootstrap object
`digits`	= print out numeric with specific digits
`geterror,`	summary error case, default FALSE
`verbose`	show summary on screen, default TRUE
`factor.scores`	- theta and tau output flag, default is FALSE

Details

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. A copy of the GNU General Public License is available at http://www.gnu.org/licenses/

Value

table

---

summary.fit.model	*summary the information of fit.model class*

Description

Copyright (C) 2021-2023 The ORF Project Team

Usage

```
## S3 method for class 'fit.model'
summary(object, digits = 4, ...)
```

Arguments

`object`	= object
`digits`	= print out numeric with specific digits
`...`	= parameter

Details

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. A copy of the GNU General Public License is available at http://www.gnu.org/licenses/

Value

printing information

| summary.scoring | *summary the information of wcpm class* |

Description

Copyright (C) 2021-2023 The ORF Project Team

Usage

```
## S3 method for class 'scoring'
summary(
  object,
  digits = 4,
  verbose = TRUE,
  factor.scores = TRUE,
  show = "short"
)
```

Arguments

`object`	= object
`digits`	= print out numeric with specific digits
`verbose`	- boolean, if TRUE, shows the summary, default is TRUE
`factor.scores`	- theta and tau output flag, default is TRUE # before was FALSE
`show`	- output flag, "long" and "short", default "short" only output estimate result. "long" will output estimate result and data.

Details

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version. This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details. A copy of the GNU General Public License is available at http://www.gnu.org/licenses/

Value

scoring dataset with task information and estimated score

Index