Package 'ISR'

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Title The Iterated Score Regression-Based Estimation

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Description We use the ISR to handle with PCA-based missing data with high correlation, and the DISR to handle with distributed PCA-based missing data. The philosophy of the package is described in Guo G. (2024) <doi:10.1080/03610918.2022.2091779>.

Encoding UTF-8

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LazyData true

RoxygenNote 7.3.2

Imports MASS, stats

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

Depends R (>= 3.5.0)

NeedsCompilation no

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Repository CRAN

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Contents

CKD *CKD*

Description

chronic kidney disease

Usage

```
data("CKD")
```

Format

The format is: num [1:400, 1:18] 48 7 62 48 51 60 68 24 52 53 ... - attr(*, "dimnames")=List of 2 ..$: NULL ..$: chr [1:18] "age" "bp" "sg" "al" ...

Details

There are 1010 missing values in the data set, accounting for 14.03 percent.

Source

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References

Polat, H., Danaei-Mehr, H., and Cetin, A. (2017). Diagnosis of chronic kidney disease based on support vector machine by feature selection methods. Journal of Medical Systems, 41(4), 1-11.

Examples

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

DISR *Caculate the estimator with the DISR method*

Description

Caculate the estimator with the DISR method

Usage

```
DISR(data, data0, real = TRUE, example = FALSE, D)
```

Arguments

data	is the orignal data set
data0	is the missing data set
real	is to judge whether the data set is a real missing data set
example	is to judge whether the data set is a simulation example
D	is the number of nodes

Value

XDISR	is the estimator on the DISR method
MSEDISR	is the MSE value of the DISR method
MAEDISR	is the MAE value of the DISR method
REDISR	is the RE value of the DISR method
GCVDISR	is the GCV value of the DISR method
timeDISR	is the time cost of the DISR method

Examples

```
library(MASS)
n=100;p=10;per=0.1
X0=data=matrix(mvrnorm(n*p,0,1),n,p)
m=round(per*n*p,digits=0)
mr=sample(1:(n*p),m,replace=FALSE)
X0[mr]=NA;data0=X0
DISR(data=data,data0=data0,real=FALSE,example=FALSE,D=2)
```

HCV *HCV*

Description

Hepatitis C virus

Usage

```
data("HCV")
```

Format

The format is: num [1:615, 1:13] 1 1 1 1 1 1 1 1 1 1 ... - attr(*, "dimnames")=List of 2 ..$: chr [1:615] "1" "2" "3" "4" ... ..$: chr [1:13] "Category" "Age" "Sex" "ALB" ...

Details

There are 31 missing values in the data set, accounting for 0.39 percent.

Source

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References

Lichtinghagen, R., Pietsch, D., Bantel, H., Manns, M., Brand, K. and Bahr, Matthias. (2013). The Enhanced Liver Fibrosis (ELF) Score: Normal Values, Influence Factors and Proposed Cut-Off Values.. Journal of hepatology. 59. 236-242.

Examples

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

ISR *Caculate the estimator with the ISR method*

Description

Caculate the estimator with the ISR method

Usage

```
ISR(data, data0, real = TRUE, example = FALSE)
```

Arguments

data	is the orignal data set
data0	is the missing data set
real	is to judge whether the data set is a real missing data set
example	is to judge whether the data set is a simulation example.

Value

XISR	is the estimator on the ISR method
MSEISR	is the MSE value of the ISR method
MAEISR	is the MAE value of the ISR method
REISR	is the RE value of the ISR method
GCVISR	is the GCV value of the ISR method
timeISR	is the time cost of the ISR method

Examples

```
library(MASS)
n=100;p=10;per=0.1
X0=data=matrix(mvrnorm(n*p,0,1),n,p)
m=round(per*n*p,digits=0)
mr=sample(1:(n*p),m,replace=FALSE)
X0[mr]=NA;data0=X0
ISR(data=data,data0=data0,real=FALSE,example=FALSE)
```

Mean *Caculate the estimator on the Mean method*

Description

Caculate the estimator on the Mean method

Usage

```
Mean(data, data0, real = TRUE, example = FALSE)
```

Arguments

data	is the orignal data set
data0	is the missing data set
real	is to judge whether the data set is a real missing data set
example	is to judge whether the data set is a simulation example.

Value

XMean	is the estimator on the Mean method
MSEMean	is the MSE value of the Mean method
MAEMean	is the MAE value of the Mean method
REMean	is the RE value of the Mean method
GCVMean	is the GCV value of the Mean method
timeMean	is the time cost of the Mean method

Examples

```
library(MASS)
n=100;p=10;per=0.1
X0=data=matrix(mvrnorm(n*p,0,1),n,p)
m=round(per*n*p,digits=0)
mr=sample(1:(n*p),m,replace=FALSE)
X0[mr]=NA;data0=X0
Mean(data=data,data0=data0,real=FALSE,example=FALSE)
```

MMLPCA *Caculate the estimator on the MMLPCA method*

Description

Caculate the estimator on the MMLPCA method

Usage

```
MMLPCA(data, data0, real = TRUE, example = FALSE)
```

Arguments

data	is the orignal data set
data0	is the missing data set
real	is to judge whether the data set is a real missing data set
example	is to judge whether the data set is a simulation example.

Value

XMMLPCA	is the estimator on the MMLPCA method
MSEMMLPCA	is the MSE value of the MMLPCA method
MAEMMLPCA	is the MAE value of the MMLPCA method
REMMLPCA	is the RE value of the MMLPCA method
GCVMMLPCA	is the GCV value of the MMLPCA method
timeMMLPCA	is the time cost of the MMLPCA method

Examples

```
library(MASS)
n=100;p=10;per=0.1
X0=data=matrix(mvrnorm(n*p,0,1),n,p)
m=round(per*n*p,digits=0)
mr=sample(1:(n*p),m,replace=FALSE)
X0[mr]=NA;data0=X0
MMLPCA(data=data,data0=data0,real=FALSE,example=FALSE)
```

MNIPALS *Caculate the estimator on the MNIPALS method*

Description

Caculate the estimator on the MNIPALS method

Usage

```
MNIPALS(data, data0, real = TRUE, example = FALSE)
```

Arguments

data	is the orignal data set
data0	is the missing data set
real	is to judge whether the data set is a real missing data set
example	is to judge whether the data set is a simulation example.

Value

XMNIPALS	is the estimator on the MNIPALS method
MSEMNIPALS	is the MSE value of the MNIPALS method
MAEMNIPALS	is the MAE value of the MNIPALS method
REMNIPALS	is the RE value of the MNIPALS method
GCVMNIPALS	is the GCV value of the MNIPALS method
timeMNIPALS	is the time cost of the MNIPALS method

Examples

```
library(MASS)
n=100;p=10;per=0.1
X0=data=matrix(mvrnorm(n*p,0,1),n,p)
m=round(per*n*p,digits=0)
mr=sample(1:(n*p),m,replace=FALSE)
X0[mr]=NA;data0=X0
MNIPALS(data=data,data0=data0,real=FALSE,example=FALSE)
```

MRPCA *Caculate the estimator on the MRPCA method*

Description

Caculate the estimator on the MRPCA method

Usage

```
MRPCA(data, data0, real = TRUE, example = FALSE)
```

Arguments

data	is the orignal data set
data0	is the missing data set
real	is to judge whether the data set is a real missing data set
example	is to judge whether the data set is a simulation example

Value

XMRPCA	is the estimator on the MRPCA method
MSEMRPCA	is the MSE value of the MRPCA method
MAEMRPCA	is the MAE value of the MRPCA method
REMRPCA	is the RE value of the MRPCA method
GCVMRPCA	is the GCV value of the MRPCA method
timeMRPCA	is the time cost of the MRPCA method

Examples

```
library(MASS)
library(MASS)
n=100;p=10;per=0.1
X0=data=matrix(mvrnorm(n*p,0,1),n,p)
m=round(per*n*p,digits=0)
mr=sample(1:(n*p),m,replace=FALSE)
X0[mr]=NA;data0=X0
MRPCA(data=data,data0=data0,real=FALSE,example=FALSE)
```

orange *orange*

Description

orange

Usage

```
data("orange")
```

Format

The format is: num [1:12, 1:8] 4.79 4.58 4.71 6.58 NA ... - attr(*, "dimnames")=List of 2 ..$: chr [1:12] "1" "2" "3" "4" ... ..$: chr [1:8] "Color.intensity" "Odor.intensity" "Attack.intensity" "Sweet" ...

Details

There are 19 missing values in the data set, accounting for 19.79 percent.

Source

http://factominer.free.fr/missMDA/index.html

References

Josse J, Husson F (2016). missMDA: A Package for Handling Missing Values in Multivariate Data Analysis. Journal of Statistical Software, 70(1), 1–31.

Examples

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

ozone *ozone*

Description

ozone

Usage

```
data("ozone")
```

Format

A data frame with 112 observations on the following 11 variables.

`maxO3` a numeric vector

`T9` a numeric vector

`T12` a numeric vector

`T15` a numeric vector

`Ne9` a numeric vector

`Ne12` a numeric vector

`Ne15` a numeric vector

`Vx9` a numeric vector

`Vx12` a numeric vector

`Vx15` a numeric vector

`maxO3v` a numeric vector

Details

There are 115 missing values in it, accounting for 9.96 percent.

Source

http://factominer.free.fr/missMDA/index.html

References

Audigier, V., Husson, F., and Josse, J. (2014). A principal components method to impute missing values for mixed data. Advances in Data Analysis and Classification, 10(1), 5-26.

Examples

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

`PM2.5` *PM2.5*

Description

Beijing PM2.5

Usage

```
data("PM2.5")
```

Format

The format is: num [1:43824, 1:12] 2010 2010 2010 2010 2010 2010 2010 2010 2010 2010 ... - attr(*, "dimnames")=List of 2 ..$: chr [1:43824] "1" "2" "3" "4" ... ..$: chr [1:12] "year" "month" "day" "hour" ...

Details

It records 43824 daily measurements on 12 variables and there are 2067 missing values on 2067 measurements, accounting for 0.00393.

Source

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References

X. Liang, T. Zou, B. Guo, S. Li, H. Zhang, S. Zhang, H. Huang, and S. Chen. Assessing Beijing's PM2.5 pollution: severity, weather impact, APEC and winter heating. Proceedings of the Royal Society A, 471(2182):1–20, 2015.

Examples

```
data(PM2.5)
## maybe str(PM2.5) ; plot(PM2.5) ...
```

---

review *review*

Description

Travel reviews

Usage

```
data("review")
```

Format

The format is: num [1:980, 1:10] 0.93 1.02 1.22 0.45 0.51 0.99 0.9 0.74 1.12 0.7 ... - attr(*, "dimnames")=List of 2 ..$: chr [1:980] "User_1" "User_2" "User_3" "User_4" ... ..$: chr [1:10] "Category_1" "Category_2" "Category_3" "Category_4" ...

Details

980 travelers' reviews of 10 different types of travel facilities in East Asia

Source

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References

Renjith, S., Sreekumar, A., and Jathavedan, M. (2018). Evaluation of partitioning clustering algorithms for processing social media data in tourism domain. 2018 IEEE Recent Advances in Intelligent Computational Systems (RAICS), 127-131.

Examples

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

SR *Caculate the estimator on the SR method*

Description

Caculate the estimator on the SR method

Usage

```
SR(data, data0, real = TRUE, example = FALSE)
```

Arguments

data	is the orignal data set
data0	is the missing data set
real	is to judge whether the data set is a real missing data set
example	is to judge whether the data set is a simulation example.

Value

XSR	is the estimator on the SR method
MSESR	is the MSE value of the SR method
MAESR	is the MAE value of the SR method
RESR	is the RE value of the SR method
GCVSR	is the GCV value of the SR method

Examples

```
library(MASS)
n=100;p=10;per=0.1
X0=data=matrix(mvrnorm(n*p,0,1),n,p)
m=round(per*n*p,digits=0)
mr=sample(1:(n*p),m,replace=FALSE)
X0[mr]=NA;data0=X0
SR(data=data,data0=data0,real=FALSE,example=FALSE)
```

Index