Title The Sparse Online Principal Component Estimation Algorithm

Description The sparse online principal component can not only process the real-time updated data set and stream data set, but also obtain the sparse solution of the updated data set. The philosophy of the package is described in Guo G. (2018) <doi:10.1080/10485252.2018.1531130>.

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Description
The EMG Physical Action-Hugging data set.

Usage
data("Hugging")

Format
A data frame with 9752 observations on the following 8 variables.

A a numeric vector
B a numeric vector
C a numeric vector
D a numeric vector
E a numeric vector
F a numeric vector
G a numeric vector
H a numeric vector

Details
The data set is a body movement data set, including 10 normal and 10 aggressive body movements. The data frame with 9752 observations on the following 8 variables.

Source
The Hugging data set comes from the UCI database.

References

Examples
data(Hugging)
## maybe str(Hugging); plot(Hugging) ...
The online principal components can handle data sets that are updated in real time and streaming data.

Usage

OPC(data, m, eta)

Arguments

data is a highly correlated online data set
m is the number of principal component
eta is the proportion of online data to total data

Value

Ao, Do

Examples

OPC(data=PSA, m=3, eta=0.8)

The traditional principal component method. This method can estimate the eigen space of the data set.

Usage

PC(data, m = m)

Arguments

data is a set of highly correlated variables
m is the number of principal component
Value

Ahat, Dhat

Examples

```
PC(data=PSA,m=3)
```

---

**PSA**

*Prostate Specific Antigen*

---

**Description**

The prostate specific antigen (PSA) data set.

**Usage**

```
data("PSA")
```

**Format**

- lcavol: a numeric vector
- lweight: a numeric vector
- age: a numeric vector
- lbph: a numeric vector
- svi: a numeric vector
- lcp: a numeric vector
- gleason: a numeric vector
- pgg45: a numeric vector
- lpsa: a numeric vector

**Details**

The data set comes from the prostate specific antigen (PSA) data of 96 patients collected by Stanford University Medical Center. These patients all underwent radical prostatectomy.

**Source**

The Stanford University Medical Center.

**References**

NA

**Examples**

```
data(PSA)
## maybe str(PSA) ; plot(PSA) ...
```
The sparse online principal component can not only process the real-time updated data set and stream data set, but also obtain the sparse solution of the updated data set.

**Description**

The sparse online principal component can not only process the real-time updated data set and stream data set, but also obtain the sparse solution of the updated data set.

**Usage**

SOPC(data, m, gamma, eta)

**Arguments**

- **data**: is a highly correlated online data set
- **m**: is the number of principal component
- **gamma**: is a sparse parameter
- **eta**: is the proportion of online data to total data

**Value**

Aso,Dso

**Examples**

SOPC(data=PSA, m=3, gamma=0.03, eta=0.6)

The sparse principal component can obtain sparse solutions of the eigenmatrix to better explain the relationship between principal components and original variables.

**Description**

The sparse principal component can obtain sparse solutions of the eigenmatrix to better explain the relationship between principal components and original variables.

**Usage**

SPC(data, m, gamma)
Arguments
    data: is a set of highly correlated variables
    m: is the number of principal component
    gamma: is a sparse parameter

Value
    As, Ds

Examples
    SPC(data=PSA, m=3, gamma=0.03)
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