Package 'NMFN'

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Type Package

Title Non-Negative Matrix Factorization

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Description Non-negative Matrix Factorization.

License GPL

LazyLoad yes

Repository CRAN

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Contents

NMFN-package *Non-negative Matrix Factorization - Overview*

Description

Non-negative Matrix Factorization

Details

Package:	NMFN
Type:	Package
Version:	2.0
Date:	2010-01-02
License:	GPL
LazyLoad:	yes

Author(s)

Suhai (Timothy) Liu <tim.liu@alumni.duke.edu> based on multiplicative updates (Lee and Seung 2001), alternating least squares and multinomial algorithms; Lars Kai Hansen's nnmf_als Matlab implementation; Torsten Hothorn's Moore-Penrose inverse function

References

Lee and Seung - Algorithms for non-negative matrix factorization. In Advances in Neural Information Processing Systems 13, 2001.

Examples

```
X <- matrix(1:12,3,4)
z.mm   <- nnmf(X,3)             # 3 factors via multiplicative update
z.als  <- nnmf(X,3,'nnmf_als')  # 3 factors via alternating least square
z.prob <- nnmf(X,3,'nnmf_prob') # 3 factors via multinomial
```

distance2 *Euclidean Distance between two matrices*

Description

Euclidean Distance between two matrices

Usage

```
distance2(x1, x2)
```

Arguments

x1	Matrix 1
x2	Matrix 2

Author(s)

Suhai (Timothy) Liu

Examples

```
X<-matrix(1:12,3,4)
Y<-matrix(5:16,3,4)
distance2(X,Y)
```

mpinv *Moore-Penrose Inverse*

Description

Moore-Penrose Inverse

Usage

```
mpinv(X)
```

Arguments

X	original matrix

Author(s)

Torsten Hothorn

Examples

```
X<-matrix(1:12,3,4)
m.inv = mpinv(X)
```

---

nnmf *Non-negative Matrix Factorization*

Description

Non-negative Matrix Factorization

Usage

```
nnmf(x, k, method = "nnmf_mm", maxiter = 1000, eps = 2.2204e-16)
```

Arguments

x	original input matrix
k	number of factors / components
method	which method to use for matrix factorization (default - multiplicative update)
maxiter	max number of iterations
eps	small threshold value

Author(s)

Suhai (TImothy) Liu

Examples

```
X <- matrix(1:12,3,4)
z.mm   <- nnmf(X,3)             # 3 factors via multiplicative update
z.als  <- nnmf(X,3,'nnmf_als')  # 3 factors via alternating least square
z.prob <- nnmf(X,3,'nnmf_prob') # 3 factors via multinomial
```

nnmf_als — *Non-negative Matrix Factorization via alternating least squares*

Description

Non-negative Matrix Factorization - alternating least squares method

Usage

```
nnmf_als(x, k, maxiter, eps)
```

Arguments

x	original input matrix
k	number of factors / components
maxiter	max number of iterations
eps	small threshold value

Value

W, H - returned decomposed matrices

Author(s)

Suhai (Timothy) Liu

Examples

```
X <- matrix(1:12, 3, 4)
results <- nnmf(X, 2, 'nnmf_als')
```

nnmf_mm — *Non-negative Matrix Factorization via multiplicative update*

Description

Non-negative Matrix Factorization - multiplicative update method

Usage

```
nnmf_mm(x, k, maxiter, eps)
```

Arguments

x	original input matrix
k	number of factors / components
maxiter	max number of iterations
eps	small threshold value

Value

W, H - returned decomposed matrices

Author(s)

Suhai (Timothy) Liu

References

Lee and Sung 2001

Examples

```
X <- matrix(1:12, 3, 4)

results <- nnmf(X, 2)
#which is equivalent to
results <- nnmf(X, 2, 'nnmf_mm')
```

---

nnmf_prob *Non-negative Matrix Factorization via multinomial*

Description

Non-negative Matrix Factorization - multinomial method

Usage

```
nnmf_prob(x, k, maxiter, eps)
```

Arguments

x	original input matrix
k	number of factors / components
maxiter	max number of iterations
eps	small threshold value

Value

W, H - returned decomposed matrices

Author(s)

Suhai (Timothy) Liu

Examples

```
X <- matrix(1:12, 3, 4)
results <- nnmf(X, 5, 'nnmf_prob')
```

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