Package 'Vicus'

January 20, 2025

Type Package

Title Exploiting Local Structures to Improve Network-Based Analysis of
Biological Data

Version 0.99.0

Depends R (>= 3.4.0)

Imports methods, utils, RANN, Matrix, RSpectra

Suggests scatterplot3d, knitr, rmarkdown, testthat

Description Compared with the similar graph embedding method such as Laplacian Eigenmaps, 'Vicus' can exploit more local structures of graph data. For the details of the methods, see the reference section of 'GitHub' README.md <https://github.com/rikenbit/Vicus>.

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URL https://github.com/rikenbit/Vicus

VignetteBuilder knitr

NeedsCompilation no

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Repository CRAN

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Description

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Details

The DESCRIPTION file:

Package:	Vicus
Type:	Package
Title:	Exploiting Local Structures to Improve Network-Based Analysis of Biological Data
Version:	0.99.0
Authors@R:	c(person("Koki", "Tsuyuzaki", role = c("aut", "cre"), email = "k.t.the-answer@hotmail.co.jp"))
Depends:	R (>= 3.4.0)
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URL:	https://github.com/rikenbit/Vicus
VignetteBuilder:	knitr
Author:	Koki Tsuyuzaki [aut, cre]
Maintainer:	Koki Tsuyuzaki <k.t.the-answer@hotmail.co.jp>

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embedding            Graph Embedding
graphMatrix          Graph Laplacian type matrix
```

Author(s)

NA

Maintainer: NA

References

Wang B, et al., (2017). Vicus: Exploiting local structures to improve network-based analysis of biological data. *PLOS Computational Biology*. 13(10), e1005621

See Also

graphMatrix,embedding

Examples

```
ls("package:Vicus")
```

---

embedding   *Graph Embedding*

Description

Lower dimensions are estimated from the object returned from graphMatrix function.

Usage

```
embedding(obj)
```

Arguments

obj   Object returned from graphMatrix function.

Value

A matrix (n times k)

Author(s)

Koki Tsuyuzaki

See Also

graphMatrix

Examples

```
X <- matrix(runif(10*20), nrow=10, ncol=20)
head(embedding(graphMatrix(X, K=2)))
```

---

graphMatrix   *Graph Laplacian type matrix*

Description

A symmetric matrix is returned.

Usage

```
graphMatrix(X, algorithm=c("Vicus", "LEM", "HLLE"),
  K=10, alpha=0.9, ndim=2)
```

Arguments

X	A numeric matrix (n times p).
algorithm	Algorithm to construct a graph matrix. Vicus matrix (Vicus), Graph Laplacian matrix (LEM), and Hessian Locally Linear Embedding matrix (HLLE) are available (Default: "Vicus").
K	The number of neighborhoods to construct a graph matrix (Default: 10).
alpha	An optional parameter for Vicus (Default: 0.9).
ndim	The number of lower dimension to embed the graph (Default: 2).

Value

M: A symmetric matrix (n times n). This matrix can be applied to embedding function. algorithm: algorithm parameter specified by argument ndim: ndim parameter specified by argument

Author(s)

Koki Tsuyuzaki

See Also

embedding

Examples

```
X <- matrix(runif(10*20), nrow=10, ncol=20)
str(graphMatrix(X, K=2), 2)
```

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