Package ‘dyndimred’

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Type Package
Title Dimensionality Reduction Methods in a Common Format
Version 1.0.3
Description Provides a common interface for applying dimensionality reduction methods, such as Principal Component Analysis (‘PCA’), Independent Component Analysis (‘ICA’), diffusion maps, Locally-Linear Embedding (‘LLE’), t-distributed Stochastic Neighbor Embedding (‘t-SNE’), and Uniform Manifold Approximation and Projection (‘UMAP’). Has built-in support for sparse matrices.
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Encoding UTF-8
LazyData true
Imports dynutils (>= 1.0.5), irlba, lmds
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Author Robrecht Cannoodt [aut] (<https://orcid.org/0000-0003-3641-729X>, rcannood), Wouter Saelens [aut, cre] (<https://orcid.org/0000-0002-7114-6248>, zouter)
Maintainer Wouter Saelens <wouter.saelens@gmail.com>
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**dimred**  
*Perform simple dimensionality reduction*

**Description**

Perform simple dimensionality reduction

**Usage**

```
dimred(x, method, ndim, ...)

dimred_dm_destiny(
  x,
  ndim = 2,
  distance_method = c("euclidean", "spearman", "cosine")
)

dimred_dm_diffusionmap(
  x,
  ndim = 2,
  distance_method = c("pearson", "spearman", "cosine", "euclidean", "manhattan")
)

dimred_ica(x, ndim = 3)

dimred_knn_fr(
  x,
  lmds_components = 10,
  distance_method = c("pearson", "spearman", "cosine", "euclidean", "manhattan"),
  n_neighbors = 10
)

dimred_landmark_mds(
  x,
  ndim = 2,
  distance_method = c("pearson", "spearman", "cosine", "euclidean", "manhattan")
)

dimred_lle(x, ndim = 3)
```
dimred

\texttt{dimred_mds(}
\begin{verbatim}
x, 
ndim = 2,
distance_method = c("pearson", "spearman", "cosine", "euclidean", "manhattan")
\end{verbatim}
\)
\texttt{dimred_mds_isomds(}
\begin{verbatim}
x, 
ndim = 2,
distance_method = c("pearson", "spearman", "cosine", "euclidean", "manhattan")
\end{verbatim}
\)
\texttt{dimred_mds_sammon(}
\begin{verbatim}
x, 
ndim = 2,
distance_method = c("pearson", "spearman", "cosine", "euclidean", "manhattan")
\end{verbatim}
\)
\texttt{dimred_mds_smacof(}
\begin{verbatim}
x, 
ndim = 2,
distance_method = c("pearson", "spearman", "cosine", "euclidean", "manhattan")
\end{verbatim}
\)
\texttt{dimred_pca(x, ndim = 2)}
\texttt{list_dimred_methods()}

Arguments

\begin{itemize}
\item \texttt{x} 
  Log transformed expression data, with rows as cells and columns as features
\item \texttt{method} 
  The name of the dimensionality reduction method to use
\item \texttt{ndim} 
  The number of dimensions
\item \texttt{...} 
  Any arguments to be passed to the dimensionality reduction method
\item \texttt{distance_method} 
  The name of the distance metric, see \texttt{dynutils::calculate_distance}
\item \texttt{lmds_components} 
  The number of lmds components to use. If NULL, LMDS will not be performed first. If this is a matrix, it is assumed it is a dimred for \texttt{x}.
\item \texttt{n_neighbors} 
  The size of local neighborhood (in terms of number of neighboring sample points).
\end{itemize}

Examples

\texttt{library(Matrix)}
\texttt{x <- abs(Matrix::rsparsematrix(100, 100, .5))}
\texttt{dimred(x, "pca", ndim = 3)}
dimred(x, "ica", ndim = 3)

if (interactive()) {
  dimred_dm_destiny(x)
  dimred_dm_diffusionmap(x)
  dimred_ica(x)
  dimred_landmark_mds(x)
  dimred_lle(x)
  dimred_mds(x)
  dimred_mds_isomds(x)
  dimred_mds_sammon(x)
  dimred_mds_smacof(x)
  dimred_pca(x)
  dimred_tsne(x)
  dimred_umap(x)
}

---

dimred_tsne | tSNE

**Description**

tSNE

**Usage**

dimred_tsne(
  x,
  ndim = 2,
  perplexity = 30,
  theta = 0.5,
  initial_dims = 50,
  distance_method = c("pearson", "spearman", "cosine", "euclidean", "manhattan")
)

**Arguments**

- **x**
  - Log transformed expression data, with rows as cells and columns as features
- **ndim**
  - The number of dimensions
- **perplexity**
  - numeric; Perplexity parameter (should not be bigger than $3 \times$ perplexity < nrow(X) - 1, see details for interpretation)
- **theta**
  - numeric; Speed/accuracy trade-off (increase for less accuracy), set to 0.0 for exact TSNE (default: 0.5)
- **initial_dims**
  - integer; the number of dimensions that should be retained in the initial PCA step (default: 50)
- **distance_method**
  - The name of the distance metric, see dynutils::calculate_distance
dimred_umap

See Also
Rtsne::Rtsne()

Examples
library(Matrix)
dataset <- abs(Matrix::rsparsematrix(100, 100, .5))
dimred_tsne(dataset, ndim = 3)

dimred_umap

UMAP

Description
UMAP

Usage
dimred_umap(
  x,
  ndim = 2,
  distance_method = c("euclidean", "cosine", "manhattan"),
  pca_components = 50,
  n_neighbors = 15L,
  init = "spectral",
  n_threads = 1
)

Arguments

  x          Log transformed expression data, with rows as cells and columns as features
  ndim       The number of dimensions
  distance_method The name of the distance metric, see dynutils::calculate_distance
  pca_components The number of pca components to use for UMAP. If NULL, PCA will not be
                 performed first
  n_neighbors The size of local neighborhood (in terms of number of neighboring sample
               points).
  init       Type of initialization for the coordinates. Options are:
               • "spectral" Spectral embedding using the normalized Laplacian of the
                 fuzzy 1-skeleton, with Gaussian noise added.
               • "normlaplacian". Spectral embedding using the normalized Laplacian of
                 the fuzzy 1-skeleton, without noise.
               • "random". Coordinates assigned using a uniform random distribution between -10 and 10.
common dimensionality reduction methods

Provides a common interface for applying common dimensionality reduction methods, such as PCA, ICA, diffusion maps, LLE, t-SNE, and umap.

See Also
uwot::umap()

Examples

library(Matrix)
dataset <- abs(Matrix::rsparsematrix(100, 100, .5))
dimred_umap(dataset, ndim = 3)
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