Package 'STMotif'

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Type Package

Title Discovery of Motifs in Spatial-Time Series

Version 2.0.1

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Description Allow to identify motifs in spatial-time series. A motif is a previously unknown subsequence of a (spatial) time series with relevant number of occurrences. For this purpose, the Combined Series Approach (CSA) is used.

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BugReports https://github.com/heraldoborges/STMotif/issues

URL https://github.com/heraldoborges/STMotif/wiki

Encoding UTF-8

LazyData true

Imports stats, ggplot2, reshape2, scales, grDevices, RColorBrewer, shiny

RoxygenNote 7.1.1

Suggests knitr, rmarkdown, testthat

VignetteBuilder knitr

NeedsCompilation no

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R topics documented:

`CSAMiningProcess` *CSAMiningProcess*

Description

CSA Datamining Process

Usage

```
CSAMiningProcess(D, DS, w, a, sb, tb, si, ka)
```

Arguments

`D`	Dataset containing numeric values
`DS`	Dataset containing SAX encoded values
`w`	Word Size
`a`	Number of letters to do the encode
`sb`	Spatial block size
`tb`	Temporal block size
`si`	Minimum number of occurrences inside each block
`ka`	Minimum number of spatial-time series with occurrences inside each block

Value

Return a list of ranked motifs. Each motif contains the information [isaxcode, recmatrix, vectst, rank], as described:

isaxcode: Motif sequences in character format

recmatrix: Matrix giving as information the blocks containing this motif

vectst: Coordinate of the start positions of the motif in the original dataset

rank: L of information used for motif ranking, as [dist, word, qtd, proj]

Examples

```
#CSA Datamining process
D  <- STMotif::example_dataset
DS <- NormSAX(STMotif::example_dataset,5)
rmotif <- CSAMiningProcess(D,DS,4,5,4,10,2,2)
```

display_motifsDataset *Plot a heatmap of the dataset and highlight the selected motifs from the list*

Description

Plot a heatmap of the dataset and highlight the selected motifs from the list

Usage

```
display_motifsDataset(dataset, rstmotifs, alpha)
```

Arguments

dataset	Numerical dataset
rstmotifs	List of ranked motifs
alpha	The cardinality of the SAX alphabet

Value

Heatmap dataset with seelected motifs

Examples

```
#Launch all the workflow
#Plot the result
D  <- STMotif::example_dataset
DS <- NormSAX(STMotif::example_dataset,5)
stmotifs <- SearchSTMotifs(D,DS,4,5,4,10,2,2)
rstmotifs <- RankSTMotifs(stmotifs)
display_motifsDataset(dataset = STMotif::example_dataset, rstmotifs[c(1:4)],  5)
```

display_motifsSTSeries *Plot the selected spatial-time series with the selected motifs highlighted*

Description

Plot the selected spatial-time series with the selected motifs highlighted

Usage

```
display_motifsSTSeries(dataset, rstmotifs, space = c(1:length(dataset)))
```

Arguments

dataset	Dataset containing numeric values
rstmotifs	List of ranked motifs
space	Select a range of columns to plot the corresponding spatial series

Value

Selected spatial series with the selected motifs highlighted

Examples

```
#Launch all the workflow
#Plot the result
D  <- STMotif::example_dataset
DS <- NormSAX(STMotif::example_dataset,5)
stmotifs <- SearchSTMotifs(D,DS,4,5,4,10,2,2)
rstmotifs <- RankSTMotifs(stmotifs)
display_motifsSTSeries(dataset = STMotif::example_dataset,rstmotifs[c(1:4)],space = c(1:4,10:12))
```

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example_dataset *Example of dataset*

Description

Toy example to launch functions.

Usage

```
example_dataset
```

Format

The dimensions of the dataset are 20 rows and 12 columns and this dataset contains 12 spatial-time series.

NormSAX *Normalize the data and SAX indexing*

Description

Normalize the data and SAX indexing

Usage

```
NormSAX(D, a)
```

Arguments

D	Dataset containing numeric values
a	Number of letters use to encode

Value

A normalized and encoded dataset for a given alphabet a

Examples

```
#Normalization and Sax Dataset
DS <- NormSAX(STMotif::example_dataset, 5)
```

RankSTMotifs *Rank the STmotifs Rank motifs by their quality*

Description

Rank the STmotifs Rank motifs by their quality

Usage

```
RankSTMotifs(stmotifs)
```

Arguments

stmotifs	List of identified motifs

Value

The ranked version of the identified list of motifs

Examples

```
#Search for Spatial-time Motifs
D  <- STMotif::example_dataset
DS <- NormSAX(STMotif::example_dataset,5)
stmotifs <- SearchSTMotifs(D,DS,4,5,4,10,2,2)
rstmotifs <- RankSTMotifs(stmotifs)
```

SearchSTMotifs *SearchSTMotifs*

Description

Search for Spatial-time Motifs

Usage

```
SearchSTMotifs(D, DS, w, a, sb, tb, si = 3, ka = 3)
```

Arguments

D	Dataset containing numeric values
DS	Dataset containing SAX encoded values
w	Word Size
a	Number of letters to do the encode
sb	"Space slice" Number of columns in each block
tb	"Time slice" Number of rows in each block
si	Support of Global Occurrence (GO)
ka	Support for Spatial Occurrence (SO)

Value

Return a list of identified motifs. Each motif contains the information [isaxcode, recmatrix, vectst], as described:

isaxcode: Motif sequences in character format

recmatrix: Matrix giving as information the blocks containing this motif

vectst: Coordinate of the start positions of the motif in the original dataset

Examples

```
#Search for Spatial-time Motifs
D  <- STMotif::example_dataset
DS <- NormSAX(STMotif::example_dataset,5)
stmotifs <- SearchSTMotifs(D,DS,4,5,4,10,2,2)
```

`STMotif` *Package STMotif*

Description

This package 'STSMotifs' allows to identify motifs in spatial-time series. A motif is a previously unknown subsequence of a (spatial) time series with relevant number of occurrences. For this purpose, the Combined Series Approach (CSA) is used.

Details

To have more information about the package : PACKAGE STMOTIF

`STSADatasetAdjust` *Adjust a Dataset Adjust the dimensions of a dataset to build the blocks*

Description

Adjust a Dataset Adjust the dimensions of a dataset to build the blocks

Usage

```
STSADatasetAdjust(D, tb, sb)
```

Arguments

`D`	Dataset containing numeric values
`tb`	Temporal block size
`sb`	Spatial block size

Value

Dataset adjusted to build the blocks.

Examples

```
#Adjust a block
D <- STSADatasetAdjust(STMotif::example_dataset, 20, 12)
```

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