Package 'causalMGM'

September 14, 2017

Type Package

Title Causal Learning of Mixed Graphical Models

Version 0.1.1

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Description

Allows users to learn undirected and directed (causal) graphs over mixed data types (i.e., continuous and discrete variables). To learn a directed graph over mixed data, it first calculates the undirected graph (Sedgewick et al, 2016) and then it uses local search strategies to prune-and-orient this graph (Sedgewick et al, 2017). AJ Sedgewick, I Shi, RM Donovan, PV Benos (2016) <doi:10.1186/s12859-016-1039-0>. AJ Sedgewick, JD Ramsey, P Spirtes, C Glymour, PV Benos (2017) <arXiv:1704.02621>.

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Encoding UTF-8

LazyData true

Depends R (>= 3.2.0), rJava

SystemRequirements Java (>= 1.7), JRI

NeedsCompilation no

Repository CRAN

Date/Publication 2017-09-14 15:34:48 UTC

R topics documented:

`get_directed_graph` *Get Directed Graph*

Description

Gets the directed graph from a dataset based on the undirected graph

Author(s)

Neha Abraham

`loadData` *Loads dataset into a DataSet object*

Description

Prompts user for file containing dataset and creates a DataSet object

Usage

```
loadData(data_table, file=FALSE)
```

Arguments

`data_table`	One-way R table
`file`	Boolean value, set to true to use dataset from file, false to use data_table

Value

`ds`	DataSet object

Note

Should be called after mgm_init() File containing dataset must be a .txt tab-delimited file. The first row must contain the names of the variables and the remaining rows must contain the values of the variables.

Author(s)

Neha Abraham, Panagiotis Benos

Examples

```
library(rJava)
mgm_init()
ds <- loadData(file=TRUE) # to load dataset from file
ds <- loadData(data_table) # to load dataset from table
```

loadSampleData *Load Sample Dataset*

Description

This function loads a sample dataset for users to experiment with.

Usage

```
loadSampleData()
```

Value

ds	Dataset Java Object Reference

Author(s)

Neha Abraham

Examples

```
library(rJava)
mgm_init()
ds <- loadSampleData()
```

mgm *Mixed Graphical Model*

Description

Returns the undirected graph of a mixed data set of continuous and discrete variables. This is an improved version of the Lee & Hastie algorithm (JMLR, 2012). The improvements include the use of three sparsity parameters, depending on the edge type (continuous-continuous, continuous-discrete, discrete-discrete) and a subsampling method to find the optimal sparsities. It also outputs the graph to a .txt file

Usage

```
mgm(ds)
```

Arguments

ds	DataSet object returned from loadData()

Value

mgm_graph	Graph object, undirected graph resulting from MGM

Author(s)

AJ Sedgewick, Neha Abraham, Panagiotis Benos

References

AJ Sedgewick, I Shi, RM Donovan, PV Benos, "Learning mixed graphical models with separate sparsity parameters and stability-based model selection", 2016, BM Bioinformatics 17(Suppl 5):S175 DOI: 10.1186/s12859-016-1039-0 https://bmcbioinformatics.biomedcentral.com/articles/10.1186/s12859-016-1039-0

Examples

```
library(rJava)
mgm_init()
ds <- loadSampleData()
mgm_graph <- mgm(ds)
```

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mgm.cpc *Conservative PC*

Description

Returns the directed graph using the conservative Peter-Clark algorithm.

Usage

```
mgm.cpc(ds, graph)
```

Arguments

ds	Dataset Object
graph	Undirected graph received by calling the function mgm()

Value

Returns the directed graph

Author(s)

Neha Abraham, Vineet Raghu, Panagiotis Benos

Examples

```
library(causalMGM)
mgm_init()
ds <- loadSampleData()
graph <- mgm(ds)
mgm.cpc(ds, graph)
```

`mgm.pc_stable` *MGM PC Stable*

Description

Implements the PC-stable search algorithm () algorithm and returns the directed graph. Also outputs the graph to a .txt file

Usage

```
mgm.pc_stable(ds, graph)
```

Arguments

`ds`	DataSet object
`graph`	Graph object of DataSet

Value

`pcs_graph`	Directed graph

Author(s)

AJ Sedgewick, Neha Abraham, Panagiotis Benos

References

Andrew J Sedgewick, Joseph D. Ramsey, Peter Spirtes, Clark Glymour, Panayiotis V. Benos, "Mixed Graphical Models for Causal Analysis of Multi-modal Variables", 2017, arXiv:1704.02621 https://arxiv.org/abs/1704.02621

Examples

```
library(rJava)
mgm_init()
ds <- loadSampleData()
graph <- mgm(ds)
mgm.pc_stable(ds, graph)
```

mgm_init *Initialize causalMGM*

Description

Loads the rJava library, downloads tetradLite.jar, and initializes the JVM

Usage

```
mgm_init()
```

Note

Must be the first function called after loading the causalMGM library

Author(s)

Neha Abraham

References

https://arxiv.org/abs/1704.02621 https://bmcbioinformatics.biomedcentral.com/articles/10.1186/s12859-016-1039-0

Examples

```
library(rJava)
mgm_init()
```

randnum *Random Number*

Description

Generates a random integer

Author(s)

Neha Abraham

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