

Package ‘networktree’

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Title Recursive Partitioning of Network Models

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Description Methods to create tree models with correlation-based network models (multivariate normal distributions).

Depends R (>= 3.0.0)

License GPL-3

Encoding UTF-8

LazyData true

Imports partykit, qgraph, stats, utils, Matrix, mvtnorm, Formula, grid, graphics, gridBase

RoxygenNote 6.1.1

Suggests R.rsp, knitr, rmarkdown, fxregime, zoo

URL NA

BugReports <http://github.com/paytonjjones/networktree/issues>

NeedsCompilation no

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getnetwork	<i>getnetwork</i>
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Description

Easily extract a network from one of the nodes in a networktree object

Usage

```
getnetwork(tree, id = 1L, type = "detect", ...)
```

Arguments

tree	a networktree object
id	the node in the tree to extract. Use summary(tree) to see id numbers for each split
type	"cor", "pcor", or "glasso". Defaults to automatic detection
...	arguments passed to qgraph (e.g., "tuning", "threshold")

Examples

```
set.seed(1)
d <- data.frame(trend = 1:200, foo = runif(200, -1, 1))
d <- cbind(d, rbind(
  mvtnorm::rmvnorm(100, mean = c(0, 0, 0),
    sigma = matrix(c(1, 0.5, 0.5, 0.5, 1, 0.5, 0.5, 0.5, 1), ncol = 3)),
  mvtnorm::rmvnorm(100, mean = c(0, 0, 0),
    sigma = matrix(c(1, 0, 0.5, 0, 1, 0.5, 0.5, 0.5, 1), ncol = 3))
))
colnames(d)[3:5] <- paste0("y", 1:3)

## Now use the function
tree1 <- networktree(nodevars=d[,3:5], splitvars=d[,1:2])

getnetwork(tree1, id=1)
```

mvnfit

Maximum Likelihood Estimation for Multivariate Normal Model

Description

Fit a multivariate normal model without covariates or covariance restrictions. In addition to the (straightforward) parameter estimates the fitted log-likelihood and corresponding score contributions are computed.

Usage

```
mvnfit(y, x = NULL, start = NULL, weights = NULL, offset = NULL,
       model = c("correlation", "mean", "variance"), ..., estfun = FALSE,
       object = FALSE)
```

Arguments

y	A matrix or data.frame where each row corresponds to a k-dim observation.
x	Not used yet
start	Not used yet
weights	Not used yet
offset	Not used yet
model	Vector of characters. Specifies which estimated parameters are returned.
...	Not used yet
estfun	Logical. Should the matrix of score contributions (aka estimating functions) be returned?
object	Not used yet

Details

Used internally in when method="mob"

networktree

networktree: Partitioning of network models

Description

Computes a tree model with networks at the end of branches. Can use model-based recursive partitioning or conditional inference.

Wraps the mob() and ctree() functions from the partykit package.

Note: this package is in its early stages and the interface may change for future versions.

Usage

```
networktree(...)
```

```
## Default S3 method:
```

```
networktree(nodevars, splitvars, type = c("cor",
    "pcor", "glasso"), method = c("mob", "ctree"), model = "correlation",
    na.action = na.pass, weights = NULL, ...)
```

```
## S3 method for class 'formula'
```

```
networktree(formula, data, type = c("cor", "pcor",
    "glasso"), method = c("mob", "ctree"), na.action = na.pass,
    model = "correlation", ...)
```

Arguments

...	additional arguments passed to <code>mob_control</code> (mob) or <code>ctree_control</code> (ctree)
nodevars	the variables with which to compute the network. Can be vector, matrix, or dataframe
splitvars	the variables with which to test split the network. Can be vector, matrix, or dataframe
type	the type of network to compute. Can be "cor", "pcor", or "glasso". Note that networks are always stored internally as correlation matrices, but will be auto-adjusted in plots etc. according to type
method	"mob" or "ctree"
model	can be any combination of c("correlation", "mean", "variance") splits are determined based on the specified characteristics
na.action	a function which indicates what should happen when the data contain missing values (NAs).
weights	weights
formula	A symbolic description of the model to be fit. This should either be of type $y_1 + y_2 + y_3 \sim x_1 + x_2$ with node vectors y_1, y_2 , and y_3 or $y \sim x_1 + x_2$ with a matrix response y . x_1 and x_2 are used as partitioning variables.
data	a data frame containing the variables in the model

Examples

```

set.seed(1)
d <- data.frame(trend = 1:200, foo = runif(200, -1, 1))
d <- cbind(d, rbind(
  mvtnorm::rmvnorm(100, mean = c(0, 0, 0),
    sigma = matrix(c(1, 0.5, 0.5, 0.5, 1, 0.5, 0.5, 0.5, 1), ncol = 3)),
  mvtnorm::rmvnorm(100, mean = c(0, 0, 0),
    sigma = matrix(c(1, 0, 0.5, 0, 1, 0.5, 0.5, 0.5, 1), ncol = 3))
))
colnames(d)[3:5] <- paste0("y", 1:3)

## Now use the function
tree1 <- networktree(nodevars=d[,3:5], splitvars=d[,1:2])

## Formula interface
tree2 <- networktree(y1 + y2 + y3 ~ trend + foo, data=d)

## Conditional version
tree3 <- networktree(nodevars=d[,3:5], splitvars=d[,1:2],
  method="ctree")

## Change control arguments
tree4 <- networktree(nodevars=d[,3:5], splitvars=d[,1:2],
  alpha=0.01)

```

plot.networktree *Plotting 'treenetwork' objects*

Description

Wraps plot.party to plot a tree model with networks on the ends. Networks are plotted with qgraph, and additional arguments are passed there

Usage

```
## S3 method for class 'networktree'
plot(x, type = NULL, ...)
```

Arguments

x	an object of type 'networktree'
type	"cor", "pcor", or "glasso". If set to NULL, type detected from x
...	additional arguments passed qgraph

workaholic *Workaholism and Psychiatric Symptoms*

Description

This dataset includes 16,426 workers who were assessed on symptoms of psychiatric disorders (ADHD, OCD, anxiety, depression) and workaholism.

Usage

```
workaholic
```

Format

a dataframe. Columns represent symptoms and rows represent individuals

Details

Scales: Adult ADHD Self-Report Scale, Obsession-Compulsive Inventory-Revised, Hospital Anxiety and Depression Scale, and the Bergen Work Addiction Scale.

Also includes demographics such as age, gender, work status, position, sector, annual income.

The dataset is publicly available at <https://doi.org/10.1371/journal.pone.0152978> and can be cited as:

Andreassen, C. S., Griffiths, M. D., Sinha, R., Hetland, J., & Pallesen, S. (2016). The relationships between workaholism and symptoms of psychiatric disorders: a large-scale cross-sectional study. *PLoS One*, 11, e0152978.

Examples

```
head(workaholic)
```

```
## Example networktree with OCI-R scale  
data(workaholic)  
nodeVars <- paste("OCIR", 1:18, sep="")  
splitVars <- c("Workaholism_diagnosis", "Gender")  
myTree<-networktree(workaholic[,nodeVars], workaholic[,splitVars])  
myTree  
plot(myTree)
```

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*Topic **datasets**

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