Package 'social'

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Type Package

Title Social Autocorrelation

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Description A set of functions to quantify and visualise social autocorrelation.

License GPL (>= 2)

Imports Rcpp (>= 0.12.9)

LinkingTo Rcpp

Depends stats, graphics

RoxygenNote 6.0.1

LazyData true

NeedsCompilation yes

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R topics documented:

`social.all.paths` *All paths between two nodes*

Description

Estimate all the possible paths between two nodes in a simple graph using the stochastic method described by Roberts & Kroese (2007).

Usage

```
social.all.paths(A, start.node, end.node, max.depth = nrow(A),
  n.pilot = 5000, n.estimate = 10000)
```

Arguments

`A`	a (possibly weighted) adjacency matrix.
`start.node`	the index of the vertex from which the paths will be calculated.
`end.node`	the index of the vertex to which the paths will be calculated.
`max.depth`	the maximum length of the paths to the returned.
`n.pilot`	the number of naive paths to generate (see Roberts & Kroese, 2007).
`n.estimate`	the number of paths to generate (see Roberts & Kroese, 2007).

Value

An estimate of all the unique paths between `start.node` and `end.node` as an `nrow(A)`xN matrix, padded with zeros.

References

Roberts, B. & Kroese, D.P. (2007) Estimating the number of s-t paths in a graph. Journal of Graph Algorithms and Applications 11(1), 195-214.

Examples

```
# Using the data from Figure 1 in Roberts & Kroese (2007)
A = matrix(c(0,1,0,1,0,
             1,0,0,1,1,
             0,0,0,1,1,
             1,1,1,0,0,
             0,1,1,0,0), nrow=5)
paths = social.all.paths(A, 1, 5)
```

social.cor.matrix *Social correlation matrix*

Description

Calculates the social correlation matrix for a given network

Usage

```
social.cor.matrix(A, max.depth = nrow(A), n.pilot = 5000,
  n.estimate = 10000)
```

Arguments

A	a (possibly weighted) adjacency matrix.
max.depth	the maximum length of the paths to use.
n.pilot	parameter to be passed to social.all.paths.
n.estimate	parameter to be passed to social.all.paths.

Value

The calculated social correlation matrix.

Examples

```
A = matrix(c(0,1,0,1,0,
             1,0,0,1,1,
             0,0,0,1,1,
             1,1,1,0,0,
             0,1,1,0,0), nrow=5)
S = social.cor.matrix(A)
```

social.example1 *Example dataset 1*

Description

An example dataset for demonstrating the functions available in the social package.

Usage

```
data(social.example1)
```

Format

The dataset consists of a list with 3 items: `A`, a 30x30 adjacency matrix; `S`, a 30x30 social correlation matrix derived from `A` using `S = social.cor.matrix(A, max.depth=5)`; and `social.data`, a 30-row data frame containing two columns of numeric data, `x` and `y`, and a column of node IDs (`node.id`, corresponding to the row and column names of `A` and `S`).

Examples

```
data(social.example1)
```

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social.example2 *Example dataset 2*

Description

An example dataset for demonstrating the functions available in the social package.

Usage

```
data(social.example2)
```

Format

The dataset consists of a list with 3 items: `A`, a 30x30 adjacency matrix; `S`, a 30x30 social correlation matrix derived from `A` using `S = social.cor.matrix(A, max.depth=5)`; and `social.data`, a 30-row data frame containing two columns of numeric data, `x` and `y`, and a column of node IDs (`node.id`, corresponding to the row and column names of `A` and `S`).

Examples

```
data(social.example2)
```

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social.plot *Social scatterplot*

Description

A plot of social data against its socially lagged values

Usage

```
social.plot(x, S, ...)
```

Arguments

x	a numeric vector of social data.
S	a social correlation matrix.
...	further arguments to be passed to plot.

Value

None

Examples

```
A = matrix(c(0,1,0,1,0,
             1,0,0,1,1,
             0,0,0,1,1,
             1,1,1,0,0,
             0,1,1,0,0), nrow=5)
S = social.cor.matrix(A)
x = rnorm(nrow(A))
social.plot(x, S, ylim=c(min(x),max(x)), xlab="x", ylab="Socially lagged x")
abline(0, 1, lty=2)
```

---

social.signal *Social signal*

Description

Calculates the social signal for a given variable (essentially just Moran's I, but using the social correlation matrix as the weights)

Usage

```
social.signal(x, S)
```

Arguments

x	a numeric vector of social data.
S	a social correlation matrix.

Value

A list containing the computed global social signal (Is), the p-value of a test of the null hypothesis that there is no social autocorrelation under the assumption of normality (p.value), and the local social signal for each node (I.local).

Examples

```
A = matrix(c(0,1,0,1,0,
             1,0,0,1,1,
             0,0,0,1,1,
             1,1,1,0,0,
             0,1,1,0,0), nrow=5)
S = social.cor.matrix(A)
x = rnorm(nrow(A))
s = social.signal(x, S)
```

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