

Package ‘netCoin’

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Description Create interactive networked coincidences. It joins the data analysis power of R to study coincidences and the visualization libraries of JavaScript in one package.

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| | |
|-----------------|----|
| netCoin-package | 2 |
| allNet | 4 |
| asNodes | 7 |
| barCoin | 8 |
| cbarCoin | 9 |
| coin | 11 |
| coocur | 12 |
| dice | 13 |

| | |
|----------------------------|----|
| dichotomize | 14 |
| distant | 15 |
| edgeList | 16 |
| events | 17 |
| expectedList | 18 |
| families | 19 |
| finches | 20 |
| fromIgraph | 20 |
| Galapagos | 21 |
| layoutPolygon | 22 |
| links | 22 |
| lower | 23 |
| multigraphCreate | 24 |
| netCoin | 25 |
| netCorr | 27 |
| plot | 30 |
| print | 31 |
| sim | 32 |
| sociologists | 33 |
| summary | 34 |
| surCoin | 34 |
| timeCoin | 38 |
| toIgraph | 39 |

| | |
|--------------|-----------|
| Index | 40 |
|--------------|-----------|

| | |
|-----------------|-----------------------------|
| netCoin-package | <i>The netCoin package.</i> |
|-----------------|-----------------------------|

Description

Create interactive networked coincidences. It joins the data analysis power of R to study coincidences and the visualization libraries of JavaScript in one package.

Details

Coincidence analysis detects what events, characters, objects, attributes, or characteristics tend to occur together within certain limits.

These given limits are call scenarios (S) and are considered to be the units of analysis, and as such they have to be placed in the rows of a matrix or data.frame.

In each i scenario, a series of J events X_j , which are to be represented as dichotomous variables X_j in columns, may occur (1) or may not occur (0). Scenarios and events constitute an incidence matrix (\mathbf{I}).

Incidence matrix

$$\begin{array}{cccccc}
 & X_1 & X_2 & X_3 & \dots & X_J \\
 S_1 & 0 & 1 & 0 & \dots & 1
 \end{array}$$

$$\begin{array}{cccccc}
 S_2 & 1 & 0 & 1 & \dots & 0 \\
 \dots & \dots & \dots & \dots & \dots & \dots \\
 S_n & 1 & 1 & 0 & \dots & 1
 \end{array}$$

From this incidences matrix, a coincidence (**C**) matrix can be obtained with the function `coin`. In this matrix the main diagonal represents frequencies of X_j , while the others elements are number of coincidences between two events.

Coincidence matrix

$$\begin{array}{cccccc}
 & X_1 & X_2 & X_3 & \dots & X_J \\
 X_1 & 2 & 1 & 1 & \dots & 1 \\
 X_2 & 1 & 2 & 0 & \dots & 2 \\
 X_3 & 1 & 0 & 1 & \dots & 0 \\
 \dots & \dots & \dots & \dots & \dots & \dots \\
 X_J & 1 & 2 & 0 & \dots & 2
 \end{array}$$

Once there is a coin object, a similarity matrix can be obtained. Similarity matrices available in netCoin are:

- Matching (m), Rogers & Tanimoto (t) Gower (g) Sneath (s) and Anderberg (and).
- Jaccard (j), dice (d), antiDice (a), Ochiai (o) and Kulczynski (k).
- Hamann (ham), Yule (y), Pearson (p), odds ratio (od) and Rusell (r).

Other measures that can be obtained from coin are:

- Relative frequencies (x), conditional frequencies (i) coincidence degree (cc) and probable degree of coincidence (cp).
- Haberman (h) and Z value of Haberman (z)

To obtain similarity and other measures matrices, the function `sim` elaborates a list of them.

Similarity matrix

$$\begin{array}{cccccc}
 & X_1 & X_2 & X_3 & \dots & X_J \\
 X_1 & 1.73 & -.87 & .87 & \dots & -.87 \\
 X_2 & -.87 & 1.73 & -1.73 & \dots & 1.73 \\
 X_3 & .87 & -1.73 & 1.73 & \dots & -1.73 \\
 \dots & \dots & \dots & \dots & \dots & \dots \\
 X_J & -.87 & 1.73 & -1.73 & \dots & 1.73
 \end{array}$$

`edgeList` makes a collection of edges composed by a list of similarity measures whenever a criterion (generally $p(Z) < .50$) is met.

Edge list

| | | | |
|--------|--------|----------|------|
| source | target | Haberman | P(z) |
|--------|--------|----------|------|

| | | | | |
|---|----|----|-----------|------------|
| 1 | X1 | X3 | 0.8660254 | 0.22509243 |
| 2 | X2 | X4 | 1.7320508 | 0.09084506 |

In order to make a graph, two data frames are needed: a nodes data frames with names and other nodes attributes (see [asNodes](#)) and an edge data frame (see [edgeList](#)). For more information go to [netCoin](#).

Author

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

References

Escobar, M. (2009): "Redes Semanticas en Textos Periodisticos: Propuestas Tecnicas para su Representacion", en *Empiria*, 17, 13-39.

Escobar, M.(2015): "Studying Coincidences with Network Analysis and Other Multivariate Tools", in *The Stata Journal*, 15(4), 1118-1156.

Escobar, M. Y J. Gomez Isla (2015): "The Expression of Identity through the Image: The Photographic Archives of Miguel de Unamuno and Joaquin Turina", en *Revista Espanola de Investigaciones Sociologicas*, 152, 23-46.

allNet

Networked coincidences from incidences data.

Description

allNet produces a network object of coincidences from a data frame or a matrix with dichotomous values.

Usage

```
allNet (incidences, weight = NULL, subsample = FALSE,
        minimum = 1, maximum = nrow(incidences), sort = FALSE, decreasing = TRUE,
        nodes = NULL, frequency = FALSE, percentages = TRUE,
        name = NULL, label = NULL, ntext = NULL,
        size = "%", color = NULL, shape = NULL, group = NULL, community = NULL,
        procedures = "Haberman", criteria = "Z", Bonferroni = FALSE,
        support = -Inf, minL = -Inf, maxL = Inf,
        directed = FALSE, diagonal = FALSE, sortL = NULL, decreasingL = TRUE,
        lwidth = NULL, lweight = NULL, lcolor = NULL, ltext = NULL,
        nodeFilter = NULL, linkFilter = NULL, degreeFilter = NULL,
        nodeBipolar = FALSE, linkBipolar = FALSE, defaultColor = "#1f77b4",
        main = NULL, note = NULL, help = NULL, background = NULL,
        layout = NULL, cex = 1, controls = c(1,2,3), mode = c("network", "heatmap"),
```

```

showCoordinates = FALSE,
  showArrows = FALSE, showLegend = TRUE, showAxes = FALSE, showLabels = TRUE,
  axesLabels = NULL, language = "en", image = NULL, dir = NULL, show = TRUE,
  igraph = FALSE)

```

Arguments

| | |
|-------------|---|
| incidences | an incidence matrix or data frame with only 0/1 variables |
| weight | a vector of weights. Optimal for data.frame tables |
| subsample | restrict the analysis to scenarios with at least one event |
| minimum | minimum frequency to be considered |
| maximum | maximum frequency to be considered |
| sort | sort the coincidence matrix according to frequency of events |
| decreasing | decreasing or increasing sort of the matrix |
| nodes | a data frame with at least one vector of names. |
| frequency | a logical value true if frequencies are to be shown. Default = FALSE. |
| percentages | a logical value true if percentages are to be shown. Default = TRUE. |
| name | name of the vector with names in the nodes data frame. By default, if language="en", name is "name", if language="es" is "nombre". |
| label | name of the vector with labels in the nodes data frame. |
| ntext | name of the vector with html text in the nodes data frame. |
| size | name of the vector with size in the nodes data frame. |
| color | name of the vector with color variable in the nodes data frame. |
| shape | name of the vector with shape variable in the nodes data frame. |
| group | name of the vector with groups in the nodes data frame. |
| community | algorithm to make communities: edge_betweenness("ed"), fast_greedy("fa"), label_prop("la"), leiden_eigen("le"), louvain("lo"), optimal("op"), spinglass("sp"), walktrap("wa") |
| procedures | a vector of statistics of similarity. See below. |
| criteria | statistic to be use for selection criteria. |
| Bonferroni | Bonferroni criterium of the signification test. |
| support | minimum value of the frequency of the coincidence to be edged |
| minL | minimum value of the statistic to include the edge in the list. |
| maxL | maximum value of the statistic to include the edge in the list. |
| directed | includes same edges only once. |
| diagonal | includes auto-links |
| sortL | sort the list according to the values of a statistic. See below |
| decreasingL | order in a decreasing way. |
| lwidth | name of the vector with width variable in the links data frame. |
| lweight | name of the vector with weight variable in the links data frame. |

| | |
|-----------------|---|
| lcolor | name of the vector with color variable in the links data frame. |
| ltext | name of the vector with labels in the links data frame. |
| nodeFilter | condition for filtering nodes. |
| linkFilter | condition for filtering links. |
| degreeFilter | condition to filter the resulting network by degree. |
| nodeBipolar | a logical value that polarizes negative and positive node values in the graphical representation. Default = FALSE. |
| linkBipolar | a logical value that polarizes negative and positive link values in the graphical representation. Default = FALSE. |
| defaultColor | a character vector giving a valid html color. |
| main | upper title of the graph. |
| note | lower title of the graph. |
| help | help text of the graph. |
| background | background color or image of the graph. |
| layout | a matrix with two columns or an algorithm to elaborate the coordinates: davidson.harel drl("da"), circle("ci"), fruchterman.reingold("fr"), gem("ge"), grid("gr"), kamada.kawai("ka"), lgl("lg"), mds("md"), random("ra"), reingold.tilfo("re"), star("sta"), sugiyama("sug") |
| cex | number indicating the amount by which plotting text should be scaled relative to the default. Default = 1. |
| controls | a numeric vector indicating which controls will be shown. 1 = sidebar, 2 = selection buttons, 3 = tables. |
| mode | a character vector indicating the graph mode allowed: network, heatmap or both (both by default). |
| showCoordinates | a logical value true if the coordinates are to be shown in tables. Default = FALSE. |
| showArrows | a logical value true if the directional arrows are to be shown. Default = FALSE. |
| showLegend | a logical value true if the legend is to be shown. Default = TRUE. |
| showAxes | a logical value true if the axes are to be shown. Default = FALSE. |
| showLabels | a logical value true if the node labels are to be shown. Default = TRUE. |
| axesLabels | a character vector giving the axes names. |
| language | a character vector (es=spanish; en=english). |
| image | name of the vector with image files in the nodes data frame. |
| dir | a "character" string representing the directory where the web files will be saved. |
| show | a logical value true if the graph is to be shown. Default = TRUE. |
| igraph | Produces an igraph object instead of a netCoin object if TRUE. |

Details

Possible measures in procedures are

- Frequencies (f), Relative frequencies (x), Conditional frequencies (i), Coincidence degree (cc), Probable degree (cp),
- Expected (e), Confidence interval (con)
- Matching (m), Rogers & Tanimoto (t), Gower (g), Sneath (s), Anderberg (and),
- Jaccard (j), Dice (d), antiDice (a), Ochiai (o), Kulczynski (k),
- Hamann (ham), Yule (y), Pearson (p), odds ratio (od), Rusell (r),
- Haberman (h), Z value of Haberman (z),
- Hypergeometric p greater value (hyp).
- Convert a matrix into an edge list (shape).

Value

This function creates a netCoin object (or igraph) and, if stated, a folder in the computer with an HTML document named index.html which contains the produced graph. This file can be directly opened with your browser and sent to a web server to work properly.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# A character column (with separator)
frame <- data.frame(A = c("Man; Women", "Women; Women",
                        "Man; Man", "Undet.; Women; Man"))
data <- dichotomize(frame, "A", sep = "; ") [2:4]
allNet(data) # network object
```

asNodes

Nodes data frame.

Description

Nodes data frame from either an edge list or a coin object.

Usage

```
asNodes(C, frequency=TRUE, percentages=FALSE, language="en")
```

Arguments

| | |
|-------------|---|
| C | has to be an edge list or, better, a coin object. |
| frequency | add frequency of nodes |
| percentages | add nodes percentages |
| language | language of colnames (default=en, option=es) |

Value

A data frame with nodes' names and their frequency and/or percentages if the input is a coin object

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# From a random incidence matrix I(25X4)
I <- matrix(rbinom(100, 1, .5), nrow = 25, ncol = 4,
            dimnames = list(NULL, c("A", "B", "C", "D")))
C <- coin(I)
asNodes(C)
```

| | |
|---------|--------------------------------|
| barCoin | <i>Networked coincidences.</i> |
|---------|--------------------------------|

Description

barCoin produces a barCoin object.

Usage

```
barCoin(nodes, links, name = "name", label = NULL, text = NULL,
         incidences = "frequency", coincidences = "coincidences", note = NULL,
         cex = 1, language = c("en", "es"), dir = NULL, show = TRUE)
```

Arguments

| | |
|--------------|---|
| nodes | a data frame with at least two vectors of names and incidences. |
| links | a data frame with at least three vectors with source and target, including names of nodes and a vector of coincidences. |
| name | name of the vector with names in the nodes data frame. |
| label | name of the vector with labels in the nodes data frame. |
| text | name of the vector with html text in the nodes data frame. |
| coincidences | name of the vector with coincidences in the links data frame. |

| | |
|------------|--|
| incidences | name of the vector with incidences in the nodes data frame. |
| note | lower title of the graph. |
| cex | number indicating the amount by which plotting text should be scaled relative to the default. Default = 1. |
| language | a character vector (es=spanish; en=english). |
| dir | a "character" string representing the directory where the web files will be saved. |
| show | a logical value true if the graph is to be shown. Default = TRUE. |

Value

Object of class barCoin.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# A character column (with separator)
frame <- data.frame(A = c("Man; Women", "Women; Women",
                        "Man; Man", "Undet.; Women; Man"))
data <- dichotomize(frame, "A", sep = "; ")[2:4]
C <- coin(data) # coincidence matrix
N <- asNodes(C) # node data frame
E <- edgeList(C,"frequency") # edge data frame
barCoin(N,E) # barCoin object
```

| | |
|----------|--------------------------------|
| cbarCoin | <i>Networked coincidences.</i> |
|----------|--------------------------------|

Description

cbarCoin produces a barCoin object.

Usage

```
cbarCoin(nodes, links, name = "name", label = NULL, text = NULL,
         incidences = "frequency", coincidences = "coincidences",
         expected = "expected", confidence.interval = NULL, note = NULL,
         cex = 1, language = c("en","es"), dir = NULL, show = TRUE)
```

Arguments

| | |
|---------------------|---|
| nodes | a data frame with at least two vectors of names and incidences. |
| links | a data frame with at least three vectors with source and target, including names of nodes and a vector of coincidences. |
| name | name of the vector with names in the nodes data frame. |
| label | name of the vector with labels in the nodes data frame. |
| text | name of the vector with html text in the nodes data frame. |
| coincidences | name of the vector with coincidences in the links data frame. |
| incidences | name of the vector with incidences in the nodes data frame. |
| expected | name of the vector with expected coincidences in the links data frame. |
| confidence.interval | name of the vector with confidence interval in the links data frame. |
| note | lower title of the graph. |
| cex | number indicating the amount by which plotting text should be scaled relative to the default. Default = 1. |
| language | a character vector (es=spanish; en=english). |
| dir | a "character" string representing the directory where the web files will be saved. |
| show | a logical value true if the graph is to be shown. Default = TRUE. |

Value

Object of class barCoin.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# A character column (with separator)
frame <- data.frame(A = c("Man; Women", "Women; Women",
                        "Man; Man", "Undet.; Women; Man"))
data <- dichotomize(frame, "A", sep = "; ")[2:4]
C <- coin(data) # coincidence matrix
N <- asNodes(C) # node data frame
E <- edgeList(C, "frequency", "expected") # edge data frame
cbarCoin(N,E) # barCoin object
```

| | |
|------|----------------------------|
| coin | <i>Coincidence matrix.</i> |
|------|----------------------------|

Description

A coincidence object consists of a list with two elements: 1) the number of scenarios (n), and 2) a coincidence matrix of events, whose main diagonal figures are the frequency of events and outside this diagonal there are conjoint frequencies of these events (f)

Usage

```
coin(incidences, minimum = 1, maximum = nrow(incidences),
     sort = FALSE, decreasing = TRUE,
     total=FALSE, subsample=FALSE,
     weight=NULL)
```

Arguments

| | |
|------------|--|
| incidences | an incidence matrix or data frame with only 0/1 variables |
| minimum | minimum frequency to be considered |
| maximum | maximum frequency to be considered |
| sort | sort the coincidence matrix according to frequency of events |
| decreasing | decreasing or increasing sort of the matrix |
| total | add one first row and column with total |
| subsample | retract the analysis to scenarios with at least one event |
| weight | a vector of weights. Optimal for data.frame tables |

Details

Produce a matrix of coincidences from a matrix of incidences.

Value

An object of coin class

| | |
|---|--|
| n | Number of scenarios (rows of the incidence matrix) |
| f | Coincidence matrix |

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
## Random incidence matrix: 25 scenarios, 4 events.
I <- matrix(rbinom(100, 1, .5), nrow = 25, ncol = 4,
            dimnames = list(NULL, c("A", "B", "C", "D")))
coin(I, sort = TRUE)
```

```
## Hair by Eye by Sex table from M. Friendly (2000)
data(HairEyeColor)
H<-as.data.frame(HairEyeColor)
W<-H$Freq
I<-dichotomize(H,c("Hair", "Eye", "Sex"),add=FALSE)
coin(I,w=W)
```

coocur

Cooccurrence matrix.

Description

A cooccurrence object consists of a matrix with the number of occurrences in its main diagonal and the number of cooccurrences outside this diagonal. Besides, this object has two attributes: 1) *n* is the total of the sum of the occurrences in each row. 2) *m* is the sum of the maximum number of occurrences in each row.

Usage

```
coocur(occurrences, minimum = 1, maximum = Inf,
       sort = FALSE, decreasing = TRUE)
```

Arguments

| | |
|-------------|--|
| occurrences | an occurrence matrix or data frame |
| minimum | minimum frequency to be considered |
| maximum | maximum frequency to be considered |
| sort | sort the coincidence matrix according to frequency of events |
| decreasing | decreasing or increasing sort of the matrix |

Details

Produce a matrix of cooccurrences from a matrix of occurrences.

Value

An object of *cooc* class with a cooccurrence matrix. It has two attributes:

| | |
|----------|---|
| <i>n</i> | Total sum of occurrences) |
| <i>m</i> | Sum of maximum occurrences in each row of the occurrence matrix |

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
## Tossing two coins five times.  
D<-data.frame(Head=c(2,1,1,0,2),Tail=c(0,1,1,2,0))  
coocur(D)
```

dice

Data: Roll a die (100 times).

Description

Data frame with events as result.

Usage

```
data("dice")
```

Format

A data frame with 100 observations (scenarios) on the following 11 variables (events):

dice : a numeric vector, representing dice results
1 : a dichotomous vector of the elemental event "1"
2 : a dichotomous vector of the elemental event "2"
3 : a dichotomous vector of the elemental event "3"
4 : a dichotomous vector of the elemental event "4"
5 : a dichotomous vector of the elemental event "5"
6 : a dichotomous vector of the elemental event "6"
odd : a dichotomous vector of odd events
even : a dichotomous vector of even events
small : a dichotomous vector of small number events
large : a dichotomous vector of large number events

Source

Random extraction via `sample(1:6,100,replace=TRUE)`

References

See [events](#).

Examples

```
data(dice)
head(dice,10)
```

| | |
|-------------|---------------------|
| dichotomize | <i>Dichotomize.</i> |
|-------------|---------------------|

Description

This converts factor(s) or character(s) column(s) of a data frame into a set of dichotomous columns. Their names will correspond to the labels or text of every category.

Usage

```
dichotomize(data, variables,
             sep = "", min = 1, length = 0, values = NULL,
             sparse = FALSE, add = TRUE, sort = TRUE)
```

Arguments

| | |
|-----------|---|
| data | a data frame with a factor or textual column which can be simple (only one value for each scenario) or multiple if components are delimited with a separator. |
| variables | vector of column names that have to be converted into dichotomous vectors. |
| sep | vector of characters used to divide columns with multiple events. If this separator is "", every unique cell of every column is converted into a dichotomous data frame's column. |
| min | convert to dichotomous vectors only label or text that has a frequency less or equal to the value of this parameter. If the value of min is between 0 and 1, its value is interpreted as a percentage |
| length | maximum number of dichotomous columns generated for every variable |
| values | vector of labels or texts selected to their conversion to dichotomous columns |
| sparse | produce a sparse matrix instead of a data.frame |
| add | add the new columns to the input data.frame |
| sort | order the new columns by their frequencies |

Value

A data frame composed by the original plus the added dichotomous columns.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca, and Luis Martinez Uribe, Fundacion Juan March. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# A character column
frame1 <- data.frame(A = c("Man", "Women", "Man", "Undet.))
dichotomize(frame1, "A", sep = "; ")

# A character column (with separator)
frame2 <- data.frame(A = c("Man; Women", "Women; Women",
                          "Man; Man", "Undet.; Women; Man"))
dichotomize(frame2, "A", sep = "; ")

# A character column and another factor column (same separator)
frame3 <- data.frame(A = c("Man; Women", "Women; Women",
                          "Man; Man", "Undet.; Women; Man"),
                    C = factor(c(1:4), labels = c("Paris", "New York",
                                                  "London; New York", "<NA>")))
dichotomize(frame3, c("A", "C"), sep = "; ")
```

distant

Distance matrix.

Description

Convert a similarity matrix into a distance matrix.

Usage

```
distant(s, t = FALSE)
```

Arguments

s a similarity matrix
t return the same matrix if t=FALSE

Details

For better results, use the parameter distance in [sim](#) function.

Value

A distance matrix.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# From a random incidence matrix I(25X4)
I <- matrix(rbinom(100, 1, .5), nrow = 25, ncol = 4,
            dimnames = list(NULL, c("A", "B", "C", "D")))
J <- sim(I, "Jaccard")
distant(J, t = TRUE)
#Same results
sim(I, "Jaccard", distance = TRUE)
```

edgeList

Edge list.

Description

Convert a coincidence/similarity/distance matrix into an edge list form.

Usage

```
edgeList(data, procedures="Haberman", criteria="Z", Bonferroni=FALSE,
          min=-Inf, max=Inf, support=-Inf,
          directed=FALSE, diagonal= FALSE, sort=NULL, decreasing=TRUE)
```

Arguments

| | |
|------------|--|
| data | a coin object, let's say an R list composed by a number of scenarios (\$n) and a coincidence matrix with frequencies (\$f). In case of change of shape, data should be a matrix. |
| procedures | a vector of statistics of similarity. See below. |
| criteria | statistic to be use for selection criteria. |
| Bonferroni | Bonferroni criterium of the signification test. |
| min | minimum value of the statistic to include the edge in the list. |
| max | maximum value of the statistic to include the edge in the list. |
| support | minimum value of the frequency of the coincidence to be edged |
| directed | includes same edges only once. |
| diagonal | includes auto-links |
| sort | sort the list according to the values of a statistic. See below |
| decreasing | order in a decreasing way. |

Details

Possible measures in procedures are

- Frequencies (f), Relative frequencies (x), Conditional frequencies (i), Coincidence degree (cc), Probable degree (cp),
- Expected (e), Confidence interval (con)
- Matching (m), Rogers & Tanimoto (t), Gower (g), Sneath (s), Anderberg (and),
- Jaccard (j), Dice (d), antiDice (a), Ochiai (o), Kulczynski (k),
- Hamann (ham), Yule (y), Pearson (p), odds ratio (od), Rusell (r),
- Haberman (h), Z value of Haberman (z),
- Hypergeometric p greater value (hyp).
- Convert a matrix into an edge list (shape).

Value

A data frame in which the two first columns are source and target. The rest of the columns are the different statistics explicited in funcs parameter.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# From a random incidence matrix I(25X4)
I<-matrix(rbinom(100,1,.5),nrow=25,ncol=4,
dimnames=list(NULL,c("A","B","C","D")))
C<-coin(I)
edgeList(C)
```

events

Data: Attributes of the dice events.

Description

Data frame with the attributes of the events of dice.

Usage

```
data("events")
```

Format

A data frame with 10 observations on the following 4 variables:

name : a factor vector with 10 levels

label : a factor vector with 10 levels

frequency : a numeric vector

type : a factor vector with 2 levels

Source

```
data(dice); coin.dice<-coin(dice); asNodes(coin.dice)
```

References

See [dice](#).

Examples

```
data(events)
events
```

expectedList

Expected list.

Description

Converts a coin object to a links data frame with coincidences and expected values.

Usage

```
expectedList(data, names = NULL, min = 1, confidence=FALSE)
```

Arguments

| | |
|------------|---|
| data | is a coin object. See coin |
| names | a character vector. |
| min | minimum value of the statistic to include the edge in the list. |
| confidence | add the confidence interval if TRUE. |

Value

A links data frame with coincidences and expected values.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# A character column (with separator)
frame <- data.frame(A = c("Man; Women", "Women; Women",
                        "Man; Man", "Undet.; Women; Man"))
data <- dichotomize(frame, "A", sep = "; ") [2:4]
C <- coin(data) # coincidence matrix
expectedList(C) # edge data frame
```

families

Data: Italian families in the Renaissance.

Description

Data frame with the characteristics of powerful families of Renaissance Italy.

Usage

```
data("families")
```

Format

A data frame with 16 families (rows) and 6 characteristics.

name Family's name

frequency number of marriage links

frequencb number of business links

wealth wealth's index

priorates number of priorates on control

seat At least priorate

Source

PADGETT, J. F. Y C. K. ANSELL (1993): "Robust Action and the Rise of the Medici, 1400-1434", in *American Journal of Sociology*, 98, 1259-1319. (<http://www.jstor.org/stable/2781822>)

Examples

```
data("families")
head(families)
```

finches

Data: Finches' attributes in Galapagos islands.

Description

Data frame with events as result.

Usage

```
data("finches")
```

Format

A data frame with 13 observations (pinches) and 4 variables (name and characteristics):

name : Genus and species of the finche

frequency : number of islands where the finche can be found

type : Genus of the finche

species : name of the file containing the picture of the finche

References

Sanderson, James (2000). Testing Ecological Patterns: A Well-known Algorithm from Computer Science Aids the Evaluation of Species Distributions. *American Scientist*, 88, pp. 332-339.

Examples

```
data(finches)
head(finches,10)
```

fromIgraph

Produce interactive networks from igraph objects.

Description

fromIgraph produce an interactive network from an igraph object.

Usage

```
fromIgraph(G, layout = NULL, language = c("en","es"), dir = NULL)
```

Arguments

G an igraph object.
layout a matrix with two columns.
language a character vector (es=spanish; en=english).
dir a "character" string representing the directory where the graph will be saved.

Value

This function returns a netCoin object. If the 'dir' attribute is specified, the function creates a folder in the computer with an HTML document named index.html which contains the produced graph. This file can be directly opened with your browser and sent to a web server to work properly.

Author(s)

David Barrios and Carlos Prieto. Bioinformatics Service of Nucleus, University of Salamanca. See <http://bioinfo.usal.es/>

Galapagos

Data: Finches' presence in Galapagos Islands.

Description

Data frame with absence(0) presence(1) of finches in the Galagos Islands.

Usage

```
data("Galapagos")
```

Format

A data frame with 17 localizations (islands) and 13 variables (Genus and species of the finches):

Geospiza magnirostris

Geospiza fortis

Geospiza fuliginosa

Geospiza difficilis

Geospiza scandens

Geospiza conirostris

Camarhynchus psitticula

Camarhynchus pauper

Camarhynchus parvulus

Platyspiza crassirostris

Cactospiza pallida

Cactospiza heliobates

Certhidea olivacea

References

Sanderson, James (2000). Testing Ecological Patterns: A Well-known Algorithm from Computer Science Aids the Evaluation of Species Distributions. American Scientist, 88, pp. 332-339.

Examples

```
data(Galapagos)
head(Galapagos,10)
```

| | |
|---------------|---|
| layoutPolygon | <i>Produce a layout of any number of nodes.</i> |
|---------------|---|

Description

layoutPolygon produces a layout of any number of nodes.

Usage

```
layoutPolygon(N,nodes,deg=0,name=NULL)
```

Arguments

| | |
|-------|---------------------------------|
| N | a data frame of nodes. |
| nodes | a vector specifying nodes. |
| deg | degrees to rotate. |
| name | name of column with node names. |

Value

This function returns the input data frame of nodes with the resulting layout applied.

Author(s)

David Barrios

| | |
|-------|---|
| links | <i>Data: Links between Italian families in the Renaissance.</i> |
|-------|---|

Description

Data frame with the marriage and business links.

Usage

```
data("links")
```

Format

A data frame with 36 links (rows) amongst 16 Italian families in the Renaissance.

Albizzi
Acciaiuoli
Barbadori
Bischeri
Castellani
Guadagni
Lamberteschi
Medici
Pazzi
Peruzzi
Ridolfi
Salviati
Strozzi
Tornabuoni
Ginori
Pucci
link Type of link: marriage or business

Source

PADGETT, J. F. Y C. K. ANSELL (1993): "Robust Action and the Rise of the Medici, 1400-1434", in American Journal of Sociology, 98, 1259-1319. (<http://www.jstor.org/stable/2781822>)

Examples

```
data("links")  
head(links)
```

lower *Similarity/distance matrix display.*

Description

Display the lower part of a matrix with a specified number of decimals.

Usage

```
lower(matrix, decimals = 3)
```

Arguments

matrix a symmetric similarity/distance matrix
 decimals number of decimals to be displayed

Value

A data frame of characters.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# From a random incidence matrix I(25X4)
I <- matrix(rbinom(100, 1, .5), nrow = 25, ncol = 4,
            dimnames = list(NULL, c("A", "B", "C", "D")))
lower(sim(I, "Jaccard"), 2)
```

multigraphCreate *Produce interactive multi graphs.*

Description

multigraphCreate produce an interactive multi graph.

Usage

```
multigraphCreate(..., parallel = FALSE, language = c("en","es"),
                 dir = "MultiGraph", show = TRUE)
```

Arguments

... coin graphs (netCoin, barCoin, timeCoin) objects or html "directories".
 parallel a logical value true to show all graphs simultaneously. Default = FALSE.
 language a character vector.
 dir a "character" string representing the directory where the graph will be saved.
 show a logical value true if the graph is to be shown. Default = TRUE.

Value

The function creates a folder in your computer with an HTML document named index.html which contains the graph. This file can be directly opened with your browser.

Author(s)

David Barrios and Carlos Prieto. Bioinformatics Service of Nucleus, University of Salamanca. See <http://bioinfo.usal.es/>

Examples

```
# A character column (with separator)
frame <- data.frame(A = c("Man; Women", "Women; Women",
                        "Man; Man", "Undet.; Women; Man"))
data <- dichotomize(frame, "A", sep = "; ")[2:4]
C <- coin(data) # coincidence matrix
N <- asNodes(C) # node data frame
E <- edgeList(C,c("frequency","expected","haberman")) # edge data frame
bC<- barCoin(N,E) # barCoin object
cC<- cbarCoin(N,E) # barCoin object
nC<- netCoin(N,E) # netCoin object
multigraphCreate("Bar graph" = bC,
                 "Conditional bar graph" = cC,
                 "Net graph"=nC,
                 dir="./example", show = FALSE) # See ./example/index.html file
```

 netCoin

Networked coincidences.

Description

netCoin produces a netCoin object of coincidences. Its input has to be two data.frames: one of attributes of events or nodes, and the other of attributes of the edges or links.

Usage

```
netCoin(nodes, links, name = NULL, label = NULL,
        size = NULL, color = NULL, shape = NULL,
        ntext = NULL, group = NULL, community = NULL,
        width = NULL, weight = NULL, lcolor = NULL, ltext = NULL,
        nodeFilter = NULL, linkFilter = NULL, degreeFilter = NULL,
        nodeBipolar = FALSE, linkBipolar = FALSE, defaultColor = "#1f77b4",
        main = NULL, note = NULL, help = NULL, background = NULL,
        layout = NULL, cex = 1, controls = c(1,2,3), mode = c("network","heatmap"),
        showCoordinates = FALSE,
        showArrows = FALSE, showLegend = TRUE, showAxes = FALSE, showLabels = TRUE,
        axesLabels = NULL, language = c("en","es"), image = NULL,
        dir = NULL, show = TRUE)
```

Arguments

| | |
|--------------|---|
| nodes | a data frame with at least one vector of names. |
| links | a data frame with at least two vectors with source and target, including names of nodes. |
| name | name of the vector with names in the nodes data frame. By default, if language="en", name is "name", if language="es" is "nombre". |
| label | name of the vector with labels in the nodes data frame. |
| group | name of the vector with groups in the nodes data frame. |
| community | algorithm to make communities: edge_betweenness("ed"), fast_greedy("fa"), label_prop("la"), leiden_eigen("le"), louvain("lo"), optimal("op"), spinglass("sp"), walktrap("wa") |
| size | name of the vector with size in the nodes data frame. |
| color | name of the vector with color variable in the nodes data frame. |
| shape | name of the vector with shape variable in the nodes data frame. |
| ntext | name of the vector with html text in the nodes data frame. |
| width | name of the vector with width variable in the links data frame. |
| weight | name of the vector with weight variable in the links data frame. |
| lcolor | name of the vector with color variable in the links data frame. |
| ltext | name of the vector with labels in the links data frame. |
| nodeFilter | condition for filtering nodes. |
| linkFilter | condition for filtering links. |
| degreeFilter | numeric vector to filter the resulting network by degree. |
| nodeBipolar | a logical value that polarizes negative and positive node values in the graphical representation. Default = FALSE. |
| linkBipolar | a logical value that polarizes negative and positive link values in the graphical representation. Default = FALSE. |
| defaultColor | a character vector giving a valid html color. |
| main | upper title of the graph. |
| note | lower title of the graph. |
| help | help text of the graph. |
| background | background color or image of the graph. |
| image | name of the vector with image files in the nodes data frame. |
| layout | a matrix with two columns or an algorithm to elaborate the coordinates: davidson.harel drl("da"), circle("ci"), fruchterman.reingold("fr"), gem("ge"), grid("gr"), kamada.kawai("ka"), Igl("lg"), mds("md"), random("ra"), reingold.tilfo("re"), star("sta"), sugiyama("sug") |
| cex | number indicating the amount by which plotting text should be scaled relative to the default. Default = 1. |
| controls | a numeric vector indicating which controls will be shown. 1 = sidebar, 2 = selection buttons, 3 = tables. |

| | |
|-----------------|---|
| mode | a character vector indicating the graph mode allowed: network, heatmap or both (both by default). |
| showCoordinates | a logical value true if the coordinates are to be shown in tables. Default = FALSE. |
| showArrows | a logical value true if the directional arrows are to be shown. Default = FALSE. |
| showLegend | a logical value true if the legend is to be shown. Default = TRUE. |
| showAxes | a logical value true if the axes are to be shown. Default = FALSE. |
| showLabels | a logical value true if the node labels are to be shown. Default = TRUE. |
| axesLabels | a character vector giving the axes names. |
| language | a character vector (es=spanish; en=english). |
| dir | a "character" string representing the directory where the web files will be saved. |
| show | a logical value true if the graph is to be shown. Default = TRUE. |

Value

This function returns a netCoin object. If the 'dir' attribute is specified, the function creates a folder in the computer with an HTML document named index.html which contains the produced graph. This file can be directly opened with your browser and sent to a web server to work properly.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# A character column (with separator)
frame <- data.frame(A = c("Man; Women", "Women; Women",
                          "Man; Man", "Undet.; Women; Man"))
data <- dichotomize(frame, "A", sep = "; ") [2:4]
C <- coin(data) # coincidence matrix
N <- asNodes(C) # node data frame
E <- edgeList(C) # edge data frame
netCoin(N, E) # netCoin object
```

netCorr

Networked coincidences.

Description

netCorr produces a network object of correlations. Its input has to be at least one set of quantitative variables.

Usage

```
netCorr(variables, weight=NULL,
        minimum=-Inf, maximum=Inf,
        sort=FALSE, decreasing=TRUE,
        nodes=NULL, frequency=FALSE, means=TRUE,
        name=NULL, label = NULL, ntext = NULL,
        size = "mean", color = NULL, shape = NULL,
        group = NULL, community = NULL,
        method="pearson", criteria="p", Bonferroni=FALSE,
        minL=0, maxL=Inf,
        sortL=NULL, decreasingL=TRUE,
        lwidth = "value", lweight = "value",
        lcolor = NULL, ltext = NULL,
        nodeFilter = NULL, linkFilter = NULL, degreeFilter = NULL,
        nodeBipolar = FALSE, linkBipolar = FALSE, defaultColor = "#1f77b4",
        main = NULL, note = NULL, help = NULL, background = NULL,
        layout = NULL, cex = 1, controls = c(1,2,3), mode = c("network","heatmap"),
        showCoordinates = FALSE, showArrows = FALSE, showLegend = TRUE,
        showAxes = FALSE, showLabels = TRUE,
        axesLabels = NULL, language = "en",
        image = NULL, dir = NULL, show = TRUE,
        igraph=FALSE
    )
```

Arguments

| | |
|-------------------------|--|
| <code>variables</code> | a data frame with at least two quantitative variables. |
| <code>weight</code> | a vector of weights. Optimal for data.frame tables |
| <code>minimum</code> | minimum frequency to be considered |
| <code>maximum</code> | maximum frequency to be considered |
| <code>sort</code> | sort the correlation matrix according to the frequency of the events |
| <code>decreasing</code> | decreasing or increasing sort of the matrix |
| <code>nodes</code> | a data frame with at least one vector of names. |
| <code>frequency</code> | a logical value true if frequencies are to be shown. Default=FALSE. |
| <code>means</code> | a logical value true if means are to be shown. Default=TRUE. |
| <code>name</code> | name of the vector with names in the nodes data frame. By default, if language="en", name is "name", if language="es" is "nombre". |
| <code>label</code> | name of the vector with labels in the nodes data frame. |
| <code>ntext</code> | name of the vector with html text in the nodes data frame. |
| <code>size</code> | name of the vector with size in the nodes data frame. |
| <code>color</code> | name of the vector with color variable in the nodes data frame. |
| <code>shape</code> | name of the vector with shape variable in the nodes data frame. |
| <code>group</code> | name of the vector with groups in the nodes data frame. |

| | |
|-----------------|---|
| community | algorithm to make communities: edge_betweenness("ed"), fast_greedy("fa"), label_prop("la"), leiden_eigen("le"), louvain("lo"), optimal("op"), spinglass("sp"), walktrap("wa") |
| method | a vector of statistics of similarity. Pearson correlation by default. spearman and kendall are also possible |
| criteria | statistic to be use for selection criteria. |
| Bonferroni | Bonferroni criterium of the signification test. |
| minL | minimum value of the statistic to include the edge in the list. |
| maxL | maximum value of the statistic to include the edge in the list. |
| sortL | sort the list according to the values of a statistic. See below |
| decreasingL | order in a decreasing way. |
| lwidth | name of the vector with width variable in the links data frame. |
| lweight | name of the vector with weight variable in the links data frame. |
| lcolor | name of the vector with color variable in the links data frame. |
| ltext | name of the vector with labels in the links data frame. |
| nodeFilter | condition for filtering nodes. |
| linkFilter | condition for filtering links. |
| degreeFilter | condition to filter the resulting network by degree. |
| nodeBipolar | a logical value that polarizes negative and positive node values in the graphical representation. Default = FALSE. |
| linkBipolar | a logical value that polarizes negative and positive link values in the graphical representation. Default = FALSE. |
| defaultColor | a character vector giving a valid html color. |
| main | upper title of the graph. |
| note | lower title of the graph. |
| help | help text of the graph. |
| background | background color or image of the graph. |
| layout | a matrix with two columns. |
| cex | number indicating the amount by which plotting text should be scaled relative to the default. Default = 1. |
| controls | a numeric vector indicating which controls will be shown. 1 = sidebar, 2 = selection buttons, 3 = tables. |
| mode | a character vector indicating the graph mode allowed: network, heatmap or both (both by default). |
| showCoordinates | a logical value true if the coordinates are to be shown in tables. Default = FALSE. |
| showArrows | a logical value true if the directional arrows are to be shown. Default = FALSE. |
| showLegend | a logical value true if the legend is to be shown. Default = TRUE. |
| showAxes | a logical value true if the axes are to be shown. Default = FALSE. |

| | |
|------------|--|
| showLabels | a logical value true if the node labels are to be shown. Default = TRUE. |
| axesLabels | a character vector giving the axes names. |
| language | a character vector (es=spanish; en=english). |
| image | name of the vector with image files in the nodes data frame. |
| dir | a "character" string representing the directory where the web files will be saved. |
| igraph | Produces an igraph object instead of a netCoin object if TRUE |
| show | a logical value true if the graph is to be shown. Default = TRUE. |

Value

The function creates a netCoin object and eventually a folder in the computer with an HTML document named index.html which contains the produced graph. This file can be directly opened with your browser and sent to a web server to work properly.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# A character column (with separator)
data(iris)
netCorr(iris[,1:4],ltext="value",
  main="Correlations between measurements of Iris Species",
  note="Anderson, Edgar (1935) y Fisher, R. A. (1936)") # network object
```

| | |
|------|--|
| plot | <i>Plot a coin, netCoin, barCoin or timeCoin object.</i> |
|------|--|

Description

Function for plotting of R objects.

Usage

```
plot(x, ...)
```

Arguments

| | |
|-----|--|
| x | A coin object (see coin), netCoin object (see netCoin), barCoin object (see barCoin), timeCoin object (see timeCoin) |
| ... | Additional args |

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
## Random incidence matrix: 25 scenarios, 4 events.
I <- matrix(rbinom(100,1,.5),nrow=25,ncol=4,
            dimnames=list(NULL,c("A","B","C","D")))

N <- allNet(I, sort=TRUE,main="Title",note="Comment")
plot(N)
```

print *Print a coin, netCoin, barCoin or timeCoin object.*

Description

Print n and a coincidence lower triangle matrix for coin and cooc objects. Print title, nodes and links heads, and note for netCoin objects.

Usage

```
print(x, ...)
```

Arguments

| | |
|-----|---|
| x | A coin object (see coin), netCoin object (see netCoin), barCoin object (see barCoin), timeCoin object (see timeCoin), cooc object (see coocur) |
| ... | Additional args |

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
## Random incidence matrix: 25 scenarios, 4 events.
I <- matrix(rbinom(100,1,.5),nrow=25,ncol=4,
            dimnames=list(NULL,c("A","B","C","D")))

C <- coin(I,sort=TRUE)
C
print(C) #Alternatively

N <- allNet(I, sort=TRUE,main="Title",note="Comment")
N
print(N) #Alternatively
```

sim *Similarity matrix.*

Description

It calculates a similarity/distance matrix from either an incidence data frame/matrix or a coin object.

Usage

```
sim(input, procedures="Jaccard", distance=FALSE, minimum=1, maximum=Inf,
     sort=FALSE, decreasing=FALSE)
```

Arguments

| | |
|------------|--|
| input | a binary data frame or a coin object, let's say an R list composed by a number of scenarios (\$n) and a coincidence matrix with frequencies (\$f). |
| procedures | a vector of statistics of similarity. See details below. |
| distance | convert the similarity matrix into a distance matrix |
| minimum | minimum frequency to obtain a similarity/distance measure. |
| maximum | maximum frequency to obtain a similarity/distance measure. |
| sort | sort the list according to the values of a statistic. See details below |
| decreasing | order in a decreasing way. |

Details

Possible measures in procedures are

- Frequencies (f), Relative frequencies (x), Conditional frequencies (i), Coincidence degree (cc), Probable degree (cp),
- Expected (e), Confidence interval (con)
- Matching (m), Rogers & Tanimoto (t), Gower (g), Sneath (s), Anderberg (and),
- Jaccard (j), Dice (d), antiDice (a), Ochiai (o), Kulczynski (k),
- Hamann (ham), Yule (y), Pearson (p), odds ratio (od), Rusell (r),
- Haberman (h), Z value of Haberman (z).
- Hypergeometric p greater value (hyp).

Value

A similarity/distance matrix.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# From a random incidence matrix I(25X4)
I<-matrix(rbinom(100,1,.5),nrow=25,ncol=4,
  dimnames=list(NULL,c("A","B","C","D")))
sim(I)
#Same results
C<-coin(I)
sim(C)
```

sociologists

Data: Sociologists born in the 19th century.

Description

Data frame with names, birth and death year data, birth country and movement.

Usage

```
data("sociologists")
```

Format

A data frame with 33 observations and the following 4 variables (events) to study coincidences in time:

name : name and last name of the sociologist

birth : birth year

death : death year

birthcountry : birth country

movements : movement or school of thought

Source

Own elaboration from manuals of sociology.

References

See [events](#).

Examples

```
data(sociologists)
head(sociologists, 10)
tail(sociologists, 10)
```

| | |
|---------|---|
| summary | <i>Summary of a coin or netCoin object.</i> |
|---------|---|

Description

Produce result summaries of coin or netCoin objects.

Usage

```
summary(object, ...)
```

Arguments

| | |
|--------|--|
| object | A coin object (see coin), netCoin object (see netCoin), barCoin object (see barCoin), timeCoin object (see timeCoin) |
| ... | Additional args |

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
## Random incidence matrix: 25 scenarios, 4 events.
I <- matrix(rbinom(100,1,.5),nrow=25,ncol=4,
            dimnames=list(NULL,c("A","B","C","D")))

N <- allNet(I, sort=TRUE,main="Title",note="Comment")
summary(N)
```

| | |
|---------|--|
| surCoin | <i>Networked coincidences from a data frame.</i> |
|---------|--|

Description

surCoin produces a network object of coincidences from a data frame converting variables into dichotomies.

Usage

```
surCoin(data, variables=names(data), exogenous=NULL, commonlabel=NULL,
        weight=NULL, subsample=FALSE,
        minimum=1, maximum=nrow(data), sort=FALSE, decreasing=TRUE,
        nodes=NULL, frequency=FALSE, percentages=TRUE,
        name=NULL, label = NULL, ntext = NULL,
        size = "%", color = NULL, shape = NULL, group = NULL, community = NULL,
        procedures="Haberman", criteria="Z", Bonferroni=FALSE,
        support=-Inf, minL=-Inf, maxL=Inf,
        directed=FALSE, diagonal=FALSE, sortL=NULL, decreasingL=TRUE,
        lwidth = NULL, lweight = NULL, lcolor = NULL, ltext = NULL,
        nodeFilter = NULL, linkFilter = NULL, degreeFilter = NULL,
        nodeBipolar = FALSE, linkBipolar = FALSE, defaultColor = "#1f77b4",
        main = NULL, note = NULL, help = NULL, background = NULL,
        layout = NULL, cex = 1, controls = c(1,2,3), mode = c("network","heatmap"),
        showCoordinates = FALSE, showArrows = FALSE, showLegend = TRUE,
        showAxes = FALSE, showLabels = TRUE, axesLabels = NULL,
        language = "en", image = NULL, dir = NULL, show = TRUE,
        igraph = FALSE)
```

Arguments

| | |
|-------------|--|
| data | a data frame |
| variables | a vector of variables included in the previous data frame |
| exogenous | a vector of variables whose relations amongst them are of no interest. None by default |
| commonlabel | a vector of variables whose names are to be included in nodes labels |
| weight | a vector of weights. Optimal for data.frame tables |
| subsample | retract the analysis to scenarios with at least one event |
| minimum | minimum frequency to be considered |
| maximum | maximum frequency to be considered |
| sort | sort the coincidence matrix according to frequency of events |
| decreasing | decreasing or increasing sort of the matrix |
| nodes | a data frame with at least one vector of names. |
| frequency | a logical value true if frequencies are to be shown. Default=FALSE. |
| percentages | a logical value true if percentages are to be shown. Default=TRUE. |
| name | name of the vector with names in the nodes data frame. By default, if language="en", name is "name", if language="es" is "nombre". |
| label | name of the vector with labels in the nodes data frame. |
| ntext | name of the vector with html text in the nodes data frame. |
| size | name of the vector with size in the nodes data frame. |
| color | name of the vector with color variable in the nodes data frame. |
| shape | name of the vector with shape variable in the nodes data frame. |

| | |
|--------------|--|
| group | name of the vector with groups in the nodes data frame. |
| community | algorithm to make communities: <code>edge_betweenness("ed")</code> , <code>fast_greedy("fa")</code> , <code>label_prop("la")</code> , <code>leiden_eigen("le")</code> , <code>louvain("lo")</code> , <code>optimal("op")</code> , <code>spinglass("sp")</code> , <code>walktrap("wa")</code> |
| procedures | a vector of statistics of similarity. See below. |
| criteria | statistic to be use for selection criteria. |
| Bonferroni | Bonferroni criterium of the signification test. |
| support | minimum value of the frequency of the coincidence to be edged |
| minL | minimum value of the statistic to include the edge in the list. |
| maxL | maximum value of the statistic to include the edge in the list. |
| directed | includes same edges only once. |
| diagonal | includes auto-links |
| sortL | sort the list according to the values of a statistic. See below |
| decreasingL | order in a decreasing way. |
| lwidth | name of the vector with width variable in the links data frame. |
| lweight | name of the vector with weight variable in the links data frame. |
| lcolor | name of the vector with color variable in the links data frame. |
| ltext | name of the vector with labels in the links data frame. |
| nodeFilter | condition for filtering nodes. |
| linkFilter | condition for filtering links. |
| degreeFilter | condition to filter the resulting network by degree. |
| nodeBipolar | a logical value that polarizes negative and positive node values in the graphical representation. Default = FALSE. |
| linkBipolar | a logical value that polarizes negative and positive link values in the graphical representation. Default = FALSE. |
| defaultColor | a character vector giving a valid html color. |
| main | upper title of the graph. |
| note | lower title of the graph. |
| help | help text of the graph. |
| background | background color or image of the graph. |
| layout | a matrix with two columns or an algorithm to elaborate the coordinates: <code>davidson.harel.drl("da")</code> , <code>circle("ci")</code> , <code>fruchterman.reingold("fr")</code> , <code>gem("ge")</code> , <code>grid("gr")</code> , <code>kamada.kawai("ka")</code> , <code>lgl("lg")</code> , <code>mds("md")</code> , <code>random("ra")</code> , <code>reingold.tilfo("re")</code> , <code>star("sta")</code> , <code>sugiyama("sug")</code> |
| cex | number indicating the amount by which plotting text should be scaled relative to the default. Default = 1. |
| controls | a numeric vector indicating which controls will be shown. 1 = sidebar, 2 = selection buttons, 3 = tables. |
| mode | a character vector indicating the graph mode allowed: network, heatmap or both (both by default). |

| | |
|-----------------|---|
| showCoordinates | a logical value true if the coordinates are to be shown in tables. Default = FALSE. |
| showArrows | a logical value true if the directional arrows are to be shown. Default = FALSE. |
| showLegend | a logical value true if the legend is to be shown. Default = TRUE. |
| showAxes | a logical value true if the axes are to be shown. Default = FALSE. |
| showLabels | a logical value true if the node labels are to be shown. Default = TRUE. |
| axesLabels | a character vector giving the axes names. |
| language | a character vector (es=spanish; en=english). |
| image | name of the vector with image files in the nodes data frame. |
| dir | a "character" string representing the directory where the web files will be saved. |
| show | a logical value true if the graph is to be shown. Default = TRUE. |
| igraph | Produces an igraph object instead of a netCoin object if TRUE |

Details

Possible measures in procedures are

- Frequencies (f), Relative frequencies (x), Conditional frequencies (i), Coincidence degree (cc), Probable degree (cp),
- Expected (e), Confidence interval (con)
- Matching (m), Rogers & Tanimoto (t), Gower (g), Sneath (s), Anderberg (and),
- Jaccard (j), Dice (d), antiDice (a), Ochiai (o), Kulczynski (k),
- Hamann (ham), Yule (y), Pearson (p), odds ratio (od), Rusell (r),
- Haberman (h), Z value of Haberman (z),
- Hypergeometric p greater value (hyp).
- Convert a matrix into an edge list (shape).

Value

This function creates a netCoin object (or igraph) and, if stated, a folder in the computer with an HTML document named index.html which contains the produced graph. This file can be directly opened with your browser and sent to a web server to work properly.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# A data frame with two variables Gender and Opinion
frame<-data.frame(Gender=c(rep("Man",3),rep("Woman",3)),
                  Opinion=c("Yes","Yes","No","No","No","Yes"))
surCoin(frame,commonlabel="") # network object
```

| | |
|----------|--------------------------------|
| timeCoin | <i>Networked coincidences.</i> |
|----------|--------------------------------|

Description

timeCoin produces a timeCoin object.

Usage

```
timeCoin(nodes, name = "name", start = "start", end = "end",
         group = NULL, text = NULL, main = NULL, note = NULL, cex = 1,
         language = c("en", "es"), dir = NULL, show = TRUE)
```

Arguments

| | |
|----------|--|
| nodes | a data frame with at least two vectors of names and incidences. |
| name | name of the vector with names in the nodes data frame. |
| start | name of the vector with starts in the nodes data frame. |
| end | name of the vector with ends in the nodes data frame. |
| group | name of the vector with groups in the nodes data frame. |
| text | name of the vector with html text in the nodes data frame. |
| main | upper title of the graph. |
| note | lower title of the graph. |
| cex | number indicating the amount by which plotting text should be scaled relative to the default. Default = 1. |
| language | a character vector (es=spanish; en=english). |
| dir | a "character" string representing the directory where the web files will be saved. |
| show | a logical value true if the graph is to be shown. Default = TRUE. |

Value

Object of class timeCoin.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# Database of 19th century sociologists
data(sociologists)
timeCoin(sociologists, "name", "birth", "death", "birthcountry",
        dir = "./timeline", show = FALSE) # See ./timeline/index.html file
```

| | |
|----------|-----------------------|
| toIgraph | <i>igraph object.</i> |
|----------|-----------------------|

Description

igraph object from a netCoin object.

Usage

```
toIgraph(net)
```

Arguments

net is a netCoin object. See [netCoin](#)

Value

An igraph object.

Author(s)

Modesto Escobar, Department of Sociology and Communication, University of Salamanca. See <http://casus.usal.es/blog/modesto-escobar/>

Examples

```
# A character column (with separator)
frame <- data.frame(A = c("Man; Women", "Women; Women",
                        "Man; Man", "Undet.; Women; Man"))
data <- dichotomize(frame, "A", sep="; ")[2:4]
C <- coin(data) # coincidence matrix
N <- asNodes(C) # node data frame
E <- edgeList(C) # edge data frame
net <- netCoin(N, E) # netCoin object
toIgraph(net) # conversion into a igraph object
```

Index

*Topic **datasets**

- dice, [13](#)
- events, [17](#)
- families, [19](#)
- finches, [20](#)
- Galapagos, [21](#)
- links, [22](#)
- sociologists, [33](#)

- allNet, [4](#)
- asNodes, [4, 7](#)

- barCoin, [8, 30, 31, 34](#)

- cbarCoin, [9](#)
- coin, [3, 11, 18, 30, 31, 34](#)
- coocur, [12, 31](#)

- dice, [13, 18](#)
- dichotomize, [14](#)
- distant, [15](#)

- edgeList, [3, 4, 16](#)
- events, [13, 17, 33](#)
- expectedList, [18](#)

- families, [19](#)
- finches, [20](#)
- fromIgraph, [20](#)

- Galapagos, [21](#)

- layoutPolygon, [22](#)
- links, [22](#)
- lower, [23](#)

- multigraphCreate, [24](#)

- netCoin, [4, 25, 30, 31, 34, 39](#)
- netCoin-package, [2](#)
- netCorr, [27](#)

- plot, [30](#)
- print, [31](#)

- sim, [3, 15, 32](#)
- sociologists, [33](#)
- summary, [34](#)
- surCoin, [34](#)

- timeCoin, [30, 31, 34, 38](#)
- toIgraph, [39](#)