

Package ‘Dominance’

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Type Package

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Title Calculate and Visualize Dominance Hierarchies

Description Functions to calculate ADI (Average Dominance Index) and FDI (Frequency-Based Dominance Index). Functions to visualize the Data with Social Network Graphs with Dual Directions and Music Notation Graph. 'XLConnect' or 'openxlsx' or 'RcmdrMisc' is only necessary for comfortable Excel file handling.

See ADI-FDI Hemel-

rijk et al. (2005) <doi:10.1163/156853905774405290> de Vries et al. (2009) <doi:10.1163/156853909X412241> Musicnotation: Chase (2006) <doi:10.1186/1742-9994-3-18>.

Maintainer Knut Krueger <Knut.Krueger@equine-science.de>

Depends R (>= 3.1.0)

Imports igraph,chron

Suggests XLConnect, openxlsx, RcmdrMisc

License GPL-3

URL <https://github.com/etron770/R-Package-Dominance/issues>

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Dominance-package	<i>Dominance Calculation and Graphs in Animals</i>
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Description

The package can calculate ADI (Average Dominance Index) and can build social network graphs with dual directions, can build a Music Notation Graph

Details

The following are sources of information on **Dominance** package:

DESCRIPTION file `library(help="Dominance")`

This file package?Dominance

Some help files

[ADI](#)

[FDI](#)

[Sociogram](#)

[Musicnotation](#)

Author(s)

Knut Krueger , Konstanze Krueger

Maintainer: Who to complain to <Knut.Krueger@equine-science.de>

AddDominanceDataSheet *Function AddDominanceDataSheet*

Description

adds a Sheet with Dominance data to a loaded xlsx workbook

Usage

```
AddDominanceDataSheet(  
    workbook,  
    filename,  
    sheetname,  
    DATASheet,  
    XLSX,  
    overwrite = FALSE  
)
```

Arguments

workbook	the previous opened workbook
filename	the file name to be opened
sheetname	the sheet name
DATASheet	the data of the new sheet
XLSX	either XLConnect or openxls default: openxls
overwrite	overwrite existing file - default = no

Value

returns a list with
WB the Workbook
the opened DataSheet

Author(s)

Knut Krueger, <Knut.Krueger@equine-science.de>

Examples

```
{ #you can eihter use:  
}
```

ADI

*Function ADI***Description**

Calculates Average Dominance Index.

Usage

```
ADI(data_sheet, bytes, ...)
```

Arguments

data_sheet	<p>either a data.frame f.e imported from a data sheet containing "Name", "item.number" "action.from.", "action.to", "kind.of.action" "name.of.action", "action.number", "classification", "weighting"</p> <p>or only "action.from.", "action.to", "kind.of.action" if exists actions and items</p> <p>actions: with "name.of.action", "action.number", "classification", "weighting" weighting the factor which should be used to calculate the behavior (1 for "action.from" wins -1 for "action.to" wins) Setting a behaviour to 2 means it is count double items: with "Name", "item.number"</p>
bytes	<p>a string where each enabled action is set to 1 and each disabled action is set to 0 Setting a behaviour to 2 means it is count double</p>
...	<p>Additional parameters:</p> <p>actions (data.frame) with "name.of.action", "action.number", "classification", "weighting"; Classification 1 if "action.from" wins; Classification 2 if "action.to" wins</p> <p>weighting the factor which should be used to calculate the behavior (1 for "action.from" wins -1 for "action.to" wins) Setting a behaviour to 2 means it is count double</p> <p>vcolors as much colors as items, colors will returned as sorted ADI colors means color 1 = item rank 1, color 2 = item rank 2, and so on</p>

Details

Calculates Average Dominance Index.

Value

returns a list with
 ADI - the Average Dominance index
 Colors - the colors supported by vcolors sorted by ADI of the items
 ADI_count_matrix - the counts from which the ADI was calculated

Author(s)

Knut Krueger, <Knut.Krueger@equine-science.de>

References

The Construction of Dominance Order: Comparing Performance of Five Methods Using an Individual-Based Model C. K. Hemelrijk, J. Wantia and L. Gygas, Behaviour Vol. 142, No. 8 (Aug., 2005), pp. 1037-1058 doi: [10.1163/156853905774405290](https://doi.org/10.1163/156853905774405290)
 On using the DomWorld model to evaluate dominance ranking methods , de Vries, Han, Behaviour, Volume 146, Number 6, 2009 , pp. 843-869(27) doi: [10.1163/156853909X412241](https://doi.org/10.1163/156853909X412241)

Examples

```
{ #you can either use:
data_sheet=data.frame ("action.from"=c(1,4,2,3,4,3,4,3,4,3,4,3,4,3,4),
                        "action.to"=c(4,1,1,4,3,4,3,4,3,4,3,4,3,4,3),
"kind.of.action"= c(4,1,1,4,3,4,3,4,3,4,3,4,3,4,3),stringsAsFactors=FALSE)
items= data.frame ("Name"=c("item1","item2","item3","item4","item5","item6") ,
                  "item.number"=c(1:6),stringsAsFactors=FALSE)
actions=data.frame("name.of.action"= c("leading","following","approach","bite","threat to bite",
                                       "kick","threat to kick", "chase","retreat"),
                  "action.number"=c(1:9),
                  "classification"=c(1,2,1,1,1,1,1,1,2) ,
                  "weighting"=c(1,-1,1,1,1,1,1,1,-1),stringsAsFactors=FALSE)
#all encounters without leading and following
bytes= "001111111"
ADI(data_sheet,items=items,actions=actions,bytes)
# or you can use a complete f.e Excel sheet
# you can save this data as basic excel sheet to work with
data(data_ADI)
bytes= "001111111"
ADI(data_ADI,bytes)
}
```

change.action.without.response

Function change.action.without.response

Description

A package to calculate Dominance Indices, print Soical Network Graphs and Music Notation Graphs.

Usage

```
change.action.without.response(data.set, action, response, newaction)
```

Arguments

data.set	A data frame used f.e at ADI or FDI
action	the action which is to be searched for
response	the number of the action responding to param action
newaction	newaction must be: data.frame("name.of.action"="test","action.number"=1,"classification"=2,"weighting"=1) or "change.only" if action is present and row kind.of.action should be changed'

Value

the changed data.set

Author(s)

Knut Krueger, <Knut.Krueger@equine-science.de>

data_ADI

Demodata for ADI and FDI

Description

Demodata to calculate an ADI and FDI

Usage

```
data(data_ADI)
```

Format

A data frame with 17 observations on the following 10 variables.

Name	a character vector
item.number	a numeric vector
action.from.	a numeric vector
action.to	a numeric vector
kind.of.action	a numeric vector
observation.number	a numeric vector

name.of.action a character vector
action.number a numeric vector
classification a numeric vector
weighting a numeric vector

Examples

```
data(data_ADI)
```

data_Musicnotation *Demodata for Musicnotation*

Description

Demodata to show an Musicnotation Graph

Usage

```
data(data_Musicnotation)
```

Format

A data frame with 15 observations on the following 11 variables.

action.from a numeric vector
action.to a numeric vector
kind.of.action a numeric vector
Time a character vector
Name a character vector
item.number a numeric vector
dominance.order a numeric vector
name.of.action a character vector
action.number a numeric vector
classification a numeric vector
weighting a numeric vector

Examples

```
data(data_Musicnotation)
```

`data_Network_1`*Demodata for Social network Graph*

Description

A dataset to show a bigger sociogramm

Usage

```
data(data_Network_1)
```

Format

A data frame with 800 observations on the following 16 variables.

`Name` a numeric vector

`Beschreibung` a character vector

`item.number` a numeric vector

`dominance.order` a character vector

`age` a character vector

`sex` a character vector

`action.from.` a numeric vector

`action.to` a numeric vector

`kind.of.action` a numeric vector

`time` a POSIXct

`test.2.kind.of.action` a numeric vector

`test.3.kind.of.action` a numeric vector

`name.of.action` a character vector

`action.number` a numeric vector

`classification` a numeric vector

`weighting` a numeric vector

Examples

```
data(data_Network_1)
```

`data_Network_2`*Demodata for Social network Graph*

Description

A dataset to show a bigger sociogramm

Usage

```
data(data_Network_2)
```

Format

A data frame with 800 observations on the following 16 variables.

`Name` a numeric vector

`Beschreibung` a character vector

`item.number` a numeric vector

`dominance.order` a character vector

`age` a character vector

`sex` a character vector

`action.from.` a numeric vector

`action.to` a numeric vector

`kind.of.action` a numeric vector

`time` a POSIXct

`test.2.kind.of.action` a numeric vector

`test.3.kind.of.action` a numeric vector

`name.of.action` a character vector

`action.number` a numeric vector

`classification` a numeric vector

`weighting` a numeric vector

Examples

```
data(data_Network_2)
```

detect_bits *for internal use only*

Description

for internal use only

Usage

```
detect_bits(bits, set = TRUE)
```

Arguments

bits

set if set = TRUE returns all true bits if set = false returns all false bits

Author(s)

Knut krueger

Examples

```
print('for internal use only')
```

FDI

Function FDI

Description

Calculate FDI - the Frequency Based Dominance index.

Usage

```
FDI(data_sheet, bytes, ...)
```

Arguments

`data_sheet` **either** a data.frame f.e imported from a data sheet containing
 "Name", "item.number"
 "action.from.", "action.to", "kind.of.action"
 "name.of.action", "action.number", "classification", "weighting"
or only "action.from.", "action.to", "kind.of.action" if exists actions and items
 actions: with "name.of.action", "action.number", "classification", "weighting"
 items: with "Name", "item.number"

`bytes` a string where each enabled action is set to 1 and each disabled action is set to 0
 Setting a behaviour to 2 means it is count double

`...` **Additional parameters:**
actions (data.frame) with "name.of.action", "action.number", "classification", "weighting";
 Classification 1 if "action.from" wins; Classification 2 if "action.to" wins
Weighting the factor which should be used to calculate the behavior (1 for "action.from" wins -1 for "action.to" wins)
 Setting a behaviour to 2 means it is count double
vcolors as much colors as items, colors will returned as sorted FDI colors
 means color 1 = item rank 1, color 2 = item rank 2, and so on

Value

returns a list with
 FDI - the Frequency Based Dominance index
 Colors - the colors supported by vcolors sorted by FDI of the items
 FDI_count_matrix - the counts from which the FDI was calculated

Author(s)

Knut Krueger, <Knut.Krueger@equine-science.de>

References

The Construction of Dominance Order: Comparing Performance of Five Methods Using an Individual-Based Model C. K. Hemelrijk, J. Wantia and L. Gyax, Behaviour Vol. 142, No. 8 (Aug., 2005), pp. 1037-1058 doi: [10.1163/156853905774405290](https://doi.org/10.1163/156853905774405290)
 On using the DomWorld model to evaluate dominance ranking methods , de Vries, Han, Behaviour, Volume 146, Number 6, 2009 , pp. 843-869(27) doi: [10.1163/156853909X412241](https://doi.org/10.1163/156853909X412241)

Examples

```
{ #you can either use:
data_sheet=data.frame ("action.from"=c(1,4,2,3,4,3,4,3,4,3,4,3,4,3,4),
                       "action.to"=c(4,1,1,4,3,4,3,4,3,4,3,4,3,4,3),
                       "kind.of.action"= c(4,1,1,4,3,4,3,4,3,4,3,4,3,4,3),stringsAsFactors=FALSE)
```

```

items= data.frame ("Name"=c("item1","item2","item3","item4","item5","item6") ,
                  "item.number"=c(1:6),stringsAsFactors=FALSE)
actions=data.frame("name.of.action"= c("leading","following","approach","bite","threat to bite",
                                       "kick","threat to kick", "chase","retreat"),
                  "action.number"=c(1:9),
                  "classification"=c(1,2,1,1,1,1,1,1,2) ,
                  "weighting"=c(1,-1,1,1,1,1,1,1,-1),stringsAsFactors=FALSE)
#all encounters without leading and following
bytes= "001111111"
FDI(data_sheet,items=items,actions=actions,bytes)
# or you can use a complete f.e Excel sheet
# you can save this data as basic excel sheet to work with
data(data_ADI)
bytes= "001111111"
FDI(data_ADI,bytes)
}

```

LoadDominanceData *Function LoadDominanceData*

Description

Load Dominance data with available xlsx packages and set packages

Usage

```
LoadDominanceData(filename, sheetname, XLSX)
```

Arguments

filename	the file name to be opened
sheetname	the sheet name
XLSX	either XLConnect or openxlsx or RcmdrMisc package default: openxlsx

Value

returns a list with
 WB the Workbook
 the opened DataSheet

Author(s)

Knut Krueger, <Knut.Krueger@equine-science.de>

Examples

```
{ #you can either use:
}
```

 Musicnotation

Function Musicnotation

Description

A function to visualize interaction with a musicnotation graph.

Usage

```
Musicnotation(data_sheet, ...)
```

Arguments

data_sheet **either** a data.frame f.e imported from a data sheet containing
 "Name", "item.number"
 "action.from.", "action.to", "kind.of.action"
 "name.of.action", "action.number", "classification", "weighting"

or only "action.from.", "action.to", "kind.of.action" if exists actions and items

 actions: with "name.of.action", "action.number", "classification", "weighting"
 items: with "Name", "item.number"
 Setting a behaviour to 2 means it is count double

... **Additional parameters:**
colors a factor of colors as much as actions
lwd line width if lwd_arrows is not used also for line width arrows # TODO
 check this it not working -> no show_items all items will be shown
show_items items to be shown
angel_arrows The angel aof the arrow head default 20
length_arrows the length of the arrow default 0.05
lwd_arrows the line width of the arrows default 1
actions_colors a vector of colors for actions f.e to show one special action
starting_time builds the graph with data between starting and ending time
ending_time builds the graph with data between starting and ending time
user_colors a vector of colors as much as items to show different colors for
 items
color_bits a vector of colors as much as items 1 shows the horse colored 0 in
 black (defined with actions_colors)
 #'

Value

returns a list with
 ADI - the Average Dominance index

Author(s)

Knut Krueger, <Knut.Krueger@equine-science.de>

References

Chase, I. D. (2006). Music notation: a new method for visualizing social interaction in animals and humans. *Front Zool*, 3, 18. doi: [10.1186/17429994318](https://doi.org/10.1186/17429994318)

Examples

```
{ #you can either use:
data_sheet=data.frame ("action.from"=c(1,4,2,3,4,3,4,3,4,3,4,3,4,3,4),
                        "action.to"=c(4,1,1,4,3,4,3,4,3,4,3,4,3,4,3),
                        "kind.of.action"= c(4,1,1,4,3,4,3,4,3,4,3,4,3,4,3),
                        "Time"=c('03:15:00','03:17:30','03:20:00','03:20:30','03:21:00',
                                  '03:21:30','03:22:00','03:22:30','03:23:00','03:23:30',
                                  '03:25:00','03:25:30','03:26:00','03:26:30','03:27:00'),
                        stringsAsFactors=FALSE)
items= data.frame ("Name"=c("item1","item2","item3","item4","item5","item6") ,
                  "item.number"=c(1:6),stringsAsFactors=FALSE)
actions=data.frame("name.of.action"= c("leading","following","approach","bite","threat to bite",
                                       "kick","threat to kick", "chase","retreat"),
                  "action.number"=c(1:9),
                  "classification"=c(1,2,1,1,1,1,1,1,2) ,
                  "weighting"=c(1,-1,1,1,1,1,1,1,-1),stringsAsFactors=FALSE)
# set colors for special encounters
color= c("green","green","red","red","red","red","red","red")

Musicnotation(data_sheet=data_sheet,actions=actions,items=items,sort_dominance=TRUE)
#or you can use a complete f.e Excel sheet
#you can save this data as basic excel sheet to work with
data(data_Musicnotation)
Musicnotation(data_sheet=data_Musicnotation,sort_dominance=TRUE) }
```

rename.vars

Function rename.vars

Source code from gdata as gdata is unmaintained since 2017-06-06

Rename variables in a dataframe

Description

Function rename.vars

Source code from gdata as gdata is unmaintained since 2017-06-06

Rename variables in a dataframe

Usage

```
rename.vars(data, from = "", to = "", info = TRUE)
```

Arguments

data	frame to be modified.
from	character vector containing the current name of each variable to be renamed.
to	character vector containing the new name of each variable to be renamed.
info	boolean value indicating whether to print details of the removal/rename. Defaults to TRUE.

Value

returns the updated data frame with variables listed in from renamed to the corresponding element of to.

Author(s)

Don MacQueen (package gdata), <macq@lln1.gov.>

Examples

```
{ data <- data.frame(x=1:10,y=1:10,z=1:10)
names(data)
data <- rename.vars(data, c("x","y","z"), c("first","second","third"))
names(data)

}
```

search.win.lose *for internal use only*

Description

counts the wins and loses

Usage

```
search.win.lose(data_sheet, ...)
```

Arguments

```
data_sheet
...
```

Author(s)

Knut Krueger

Examples

```
print('for internal use only')
```

 Sociogram

Social Network Graphs

Description

computes social network graphs with igraph

Usage

```
Sociogram(data_sheet, bits, ...)
```

Arguments

<code>data_sheet</code>	either a data.frame f.e imported from a data sheet containing "Name","item.number" "action.from.,"action.to","kind.of.action" "name.of.action","action.number","classification","weighting" or only "action.from.,"action.to","kind.of.action"if exists actions and items data_sheet: with "action.from.,"action.to","kind.of.action" items with "Name","item.number"
<code>bits</code>	as sting where each enabled action is set to 1 and each disabled action is set to 0
<code>...</code>	Postscript: FALSE (default) or path to PS output file sociogram_layout: layout.auto,layout.random,layout.circle,layout.sphere,layout.fruchterman.reingold,lay curved: how much the lines between the nodes ar curved 0 ist stright, default is 0.2 scal_value: the multiplicator of the nodes, default: 1/3 linesize_add: value to add to the linesize (helpful for a graph with thin lines. default 0 log: log2 size of linewidth, default= false canvas.width: default 1000 canvas.height: default 800 tkplot: interactiv tkplot, default = true

Value

sociogram the igraph object
 counts_circles
 the count of circles
 count_interactions
 the count of interactions
 line_size the used linesize
 counts_circles
 vector of min #' and max line size
 the last for are helpful to change circle size and #' linewidth

Author(s)

Knut Krueger, <Knut.Krueger@equine-science.de>

Examples

```
{
## you can either use:
data_sheet=data.frame ("action.from"=c(1,4,2,3,4,3,4,3,4,3,4,3,4,3,4),
                        "action.to"=c(4,1,1,4,3,4,3,4,3,4,3,4,3,4,3),
                        "kind.of.action"= c(4,1,1,4,3,4,3,4,3,4,3,4,3,4,3),stringsAsFactors=FALSE)
items= data.frame ("Name"=c("item1","item2","item3","item4","item5","item6") ,
                  "item.number"=c(1:6),stringsAsFactors=FALSE)
actions=data.frame("name.of.action"= c("leading","following","approach","bite","threat to bite",
"kick","threat to kick", "chase","retreat"),
                  "action.number"=c(1:9),
                  "classification"=c(1,2,1,1,1,1,1,1,2) ,
                  "weighting"=c(1,-1,1,1,1,1,1,1,-1),stringsAsFactors=FALSE)
## all encounters without leading and following
bytes= "001111111"
Sociogram(data_sheet,items=items,actions=actions,bytes)
## mor you can use a complete f.e Excel sheet
## you can save this data as basic excel sheet to work with
data(data_Network_1)
## set 1 for action you want to show
bytes= "00111111111000000000"
Sociogram(data_Network_1,bytes)
}
```

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