Package 'RCA'

October 12, 2022

Type Package

Title Relational Class Analysis

Version 2.0

Date 2016-02-25

Author Amir Goldberg, Sarah K. Stein

Maintainer Amir Goldberg <amirgo@stanford.edu>

Depends igraph, gplots

Description Relational Class Analysis (RCA) is a method for detecting heterogeneity in attitudinal data (as described in Goldberg A., 2011, Am. J. Soc, 116(5)).

License GPL (>= 2)

NeedsCompilation no

Repository CRAN

Date/Publication 2016-02-29 11:24:27

R topics documented:

`RCA-package` *Relational Class Analysis*

Description

Relational Class Analysis (RCA) is a method for detecting heterogeneity in attitudinal data (as described in Goldberg A., 2011, Am. J. Soc, 116(5)).

The `RCA` function produces an object of class `RCA`. This object includes: (1) a vector of class membership —— `$membership`; (2) a list of modules —— `$modules`; and (3) the relationality matrix —— `$R`.

Usage

```
RCA(matrix, max = NULL, min = NULL, num = 1000,
  alpha = 0.05)

## S3 method for class 'RCA'
print(x, ...)

## S3 method for class 'RCA'
plot(x, module = NULL, colorblind = FALSE,
  heatmap = TRUE, heat_labels = FALSE,
  drop_neg_ties = TRUE, layout = layout.kamada.kawai,
  edge_color = "gray", vertex_color = "white",
  vertex_frame_color = "black", vertex_size = 20,
  vertex_label_color = "black", vertex_label_cex = 0.8,
  margin = 0, ...)
```

Arguments

matrix	a matrix of size m x n. Rows correspond to observations and columns correspond to variables.
max	either a single integer or a vector of length n. If an integer is specified, its value is used as the maximum for all variables in the matrix. If a vector is specified, then each element is used as the maximum value for each variable. The default value is NULL, in which case max is assumed to be the maximum of each variable in the input matrix.
min	either a single integer or a vector of length n. If an integer is specified, its value is used as the minimum for all variables in the matrix. If a vector is specified, then each element is used as the minimum value for each variable. The default value is NULL, in which case min is assumed to be the minimum of each variable in the input matrix.
num	the number of bootstrap samples to be used in testing for significant relationalities. The default is 1000.
alpha	a value between 0 and 1 specifying the significance level to be used in testing for significant relationalities. The default is 0.05.
x	an object of class RCA.
module	the module number to graph.
colorblind	change the graph color schemes to be colorblind friendly. Default is FALSE.
heatmap	choose which type of graph to produce. Default is TRUE for heatmap. FALSE produces an igraph.
heat_labels	add correlation labels to the heatmap. Default is FALSE.
drop_neg_ties	drop negative graph edges. Default is TRUE.
layout	choose a layout for plotting graphs. Default is layout.kamada.kawai. Additional layouts can be chosen from layout{igraph}.
edge_color	color of the graph edges. Default is gray.

`vertex_color` color of the vertices. Default is `white`.

`vertex_frame_color`
color of the vertex frames. Default is `black`.

`vertex_size` vertex frame size. Default is `20`.

`vertex_label_color`
color of the vertex labels. Default is `black`.

`vertex_label_cex`
size of the vertex labels. Default is `0.8`.

`margin` adjust the margins of the graph. Default is `0`. Negative values reduce the margins.

`...` additional arguments

Details

RCA computes the relationality between all pairs of observations and partitions the sample into subgroups of schematically overlapping respondents such that those who subscribe to the same logic are clustered together. It accomplishes this by performing the following sequence:

1.) RCA computes a measure of relationality for each pair of observations in the data set, resulting in a complete, undirected, and weighted graph.

2.) Graph edges whose weights are statistically insignificant are removed. Remaining edges are transformed by their absolute value.

3.) RCA partitions the graph into subgroups of schematically similar observations using a graph-partitioning algorithm.

Author(s)

Amir Goldberg, Sarah K. Stein

Maintainer: Amir Goldberg <amirgo@stanford.edu>

References

Goldberg, Amir. "Mapping shared understandings using relational class analysis: the case of the cultural omnivore reexamined." American Journal of Sociology 116.5 (2011): 1397-1436.

Examples

```
# Test matrix
set.seed <- 2
matrix <- round(matrix(runif(100, min = 0, max = 6),
  ncol = 5))

rca <- RCA(matrix)
rca <- RCA(matrix, max = rep(6, 5), min = rep(0, 5))
rca <- RCA(matrix, max = 6, min = 0)
rca <- RCA(matrix, num = 10000, alpha = 0.1)

summary(rca)
print(rca)
```

```
rca$membership
rca$modules[[1]]$matrix
rca$R

# Heatmap
plot(rca, module = 1)
plot(rca, module = 1, colorblind = TRUE,
  heat_labels = TRUE)

# IGraph
plot(rca, module = 1, heatmap = FALSE)
plot(rca, module = 1, heatmap = FALSE,
  layout = layout.circle, edge_color = "red",
  vertex_color = "gray", vertex_frame_color = "red",
  vertex_size = 30, vertex_label_color= "red",
  vertex_label_cex = 1, margin = 0.2)
```

Index