

Package ‘RCA’

July 2, 2014

Type Package

Title Relational Class Analysis

Version 1.4.5

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Author See the AUTHORS file.

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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)). src/ also contains the source files of igraph-C which was written by Gabor. LAPACK routines are included in the igraph source code.

Depends igraph, R (>= 2.15.1)

License GPL (>= 2)

Repository CRAN

LazyLoad yes

NeedsCompilation yes

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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)) . src also contains the source files of igraph-C which was written by Gabor.

Details

Package:	RCA
Type:	Package
Version:	1.4.1
Date:	2013-05-24
License:	GPL
LazyLoad:	yes

Author(s)

RCA C Library: Amir Goldberg
igraph : Gabor Csardi
R Wrapper: Jinjian Zhai

References

Goldberg A., 2011, Am. J. Soc. 116(5)

See Also

igraph

Examples

```
#attach("../data/SampleInputMatrix.rda")
#rcaout=RCA(SampleInputMatrix, 100, 0.075)
#rcaout$mod
#table(rcaout$member)
#rcaout$merge
#rcaout<-RCA(SampleInputMatrix,1000,0.25)
#rcaout$mod
#table(rcaout$member)
```

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)) . src also contains the source files of igraph-C which was written by Gabor.

Usage

```
RCA(inputMatrix, bootstrap = 1000, p_value = 0.05)
```

Arguments

<code>inputMatrix</code>	Input matrix. A dataset of size $N \times K$. N : observation. K : variables.
<code>bootstrap</code>	Bootstrap. Default is 1000.
<code>p_value</code>	<code>p_value</code> . Default is 0.05.

Details

Let X be a dataset of size $N \times K$. X must not include missing data. RCA finds an optimal division of X into G groups, such that each group of observations follows a distinctive pattern of relationships between the K variables. Each group comprises an exclusive subset of X , such that the K variables within each group have a unique covariance structure.

RCA divides X into a variable number of G groups, assigning each observation in X to one group. It reports a measure called modularity, which ranges from 0 to 1 and which measures the strength of the division into groups. It also reports a cluster tree which traces the process by which the data were partitioned into G groups.

Value

Results include:

```
[your_returned_data]$member: Assignment vector (size 1xN)  
Each cell in the vector includes the group number the corresponding observation  
was assigned to. Group numbers range from 0 to G-1.  
[your_returned_data]$mod: Modularity (double)  
A number ranging from 0 to 1 indicating the strength of the partition into groups.  
[your_returned_data]$merge:  
Cluster tree, reported as a merge matrix (array of varying size).  
See igraph/leading.eigenvector.community for more information.
```

Note

Depended on igraph library.

Author(s)

Amir Goldberg, Gabor Csardi, Jinjian Zhai

References

Goldberg, A., AJS 116(5): 1397-1436 (<http://http://www.jstor.org/stable/10.1086/657976>)

See Also

igraph

Examples

```
#attach("../data/SampleInputMatrix.rda")
#rcaout=RCA(SampleInputMatrix, 100, 0.075)
#rcaout$mod
#table(rcaout$member)
#rcaout$merge
#rcaout<-RCA(SampleInputMatrix,1000,0.25)
#rcaout$mod
#table(rcaout$member)
```

Result

Relational Class Analysis for R

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)). src also contains the files of igraph-C which was written by Gabor.

Format

The format is:

List of 3

\$ member: int [1:1551] 0 0 0 1 0 0 2 0 1 2 ...

\$ mod : num 0.299

\$ merge : num [1:2, 1:2] 0 3 2 1

Details

Results include:

(a)[your_returned_data]\$member: Assignment vector (size 1xN)

Each cell in the vector includes the group number the corresponding observation was assigned to. Group numbers range from 0 to G-1.

(b)[your_returned_data]\$mod: Modularity (double)

A number ranging from 0 to 1 indicating the strength of the partition into groups.

(c)[your_returned_data]\$merge:

Cluster tree, reported as a merge matrix (array of varying size). See `igraph/leading.eigenvector.community` for more information.

SampleInputMatrix *Relational Class Analysis*

Description

Sample input matrix.

Format

The format is:

```
int [1:1551, 1:17] 4 2 2 3 2 1 1 1 3 2 ...
```

Details

Let X be a dataset of size $N \times K$. X must not include missing data. RCA finds an optimal division of X into G groups, such that each group of observations follows a distinctive pattern of relationships between the K variables. Each group comprises an exclusive subset of X , such that the K variables within each group have a unique covariance structure.

Examples

```
## data(SampleInputMatrix)
```

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