Package ‘braQCA’

February 23, 2018

Title Bootstrapped Robustness Assessment for Qualitative Comparative Analysis

Version 1.0.0.1

Description Test the robustness of a user’s Qualitative Comparative Analysis solutions to randomness, using the bootstrapped assessment: baQCA(). This package also includes a function that provides recommendations for improving solutions to reach typical significance levels: brQCA(). After applying recommendations from brQCA(), QCAdiff() shows which cases are excluded from the final result.

Depends R (>= 3.2.3), dplyr, QCA, bootstrap

License GPL-2

LazyData true

NeedsCompilation no

Author C. Ben Gibson [aut, cre], Burrel Vann Jr [aut]

Maintainer C. Ben Gibson <cbgibson@uci.edu>

RoxygenNote 6.0.1

Repository CRAN

Date/Publication 2018-02-22 00:15:23

R topics documented:

<table>
<thead>
<tr>
<th>R function</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>baQCA</td>
<td>2</td>
</tr>
<tr>
<td>brQCA</td>
<td>3</td>
</tr>
<tr>
<td>conf.table</td>
<td>4</td>
</tr>
<tr>
<td>QCAdiff</td>
<td>5</td>
</tr>
<tr>
<td>QCAdiff</td>
<td>6</td>
</tr>
<tr>
<td>rallies</td>
<td>6</td>
</tr>
<tr>
<td>sim.brQCA</td>
<td>6</td>
</tr>
</tbody>
</table>

Index 8
Description

This function performs the Bootstrapped Assessment for QCA (baQCA) on a given QCA model object.

Usage

\[ \text{baQCA}(\text{mod}, \text{sim} = 2000, \text{include} = c(\"\"), \text{row.dom} = \text{F}, \text{omit} = c(), \text{dir.exp} = c()) \]

Arguments

- **mod**: name of the QCA eqmcc/minimize model object.
- **sim**: the number of simulations the baQCA function should run. Default set to sim=2000.
- **include**: [from QCA package] “A vector of additional output function values to be included in the minimization.” Default set to include=c("\").
- **row.dom**: [from QCA package] “Logical, impose row dominance as constraint on solution to eliminate dominated inessential prime implicants.” Default set to row.dom=F.
- **omit**: [from QCA package] “A vector of configuration index values or matrix of configurations to be omitted from minimization.” Default set to omit=c().
- **dir.exp**: [from QCA package] “A vector of directional expectations for deriving intermediate solutions.” Default set to dir.exp=c().

Value

After some time, this function returns the probability that the data will return a random result given the parameters set by the researcher in the model (configurational n threshold, consistency score threshold, etc), as well a confidence interval around this value. This value is interpreted similarly to a p-value, i.e. a .05 value coincides with a 95% "confidence level."

Examples

data(rallies)
P<-rallies$P
R<-rallies$R
C<-rallies$C
U<-rallies$U

qca.data<-data.frame(P,R,C,U)
rownames(qca.data)<-rownames(rallies)
truth<-truthTable(qca.data,outcome="P",sort.by="incl",incl.cut1=0.7,show.cases=TRUE)
truth
mod1 <- minimize(truth,details=TRUE,show.cases=TRUE)
mod1
Description

Provides recommendations for consistency score and configurational n thresholds to attain a desired level of confidence in a QCA algorithm application.

Usage

brQCA(qca.data, outcome = "OUT", type = "crisp", inclcut = "", ncut = 2, neg.out = F, sim = 10, verbose = T)

Arguments

- **qca.data**: the QCA data frame.
- **outcome**: the outcome variable in the QCA data frame of causal conditions; "OUT" is the outcome variable for an application of QCA.
- **type**: of QCA application, "crisp" or "fuzzy" sets. Default set to type = "crisp".
- **inclcut**: range of consistency scores for inclusion. If not specified, this defaults to seq(from = 0.5, to = 1, by = 0.1).
- **ncut**: configurational n levels to simulate. Can be altered to give options for the range of minimum to maximum ncut value that the truth table yields, by naming the truth table object (e.g. truth) and calling the minimum and maximum number of cases, using ncut=min(truth$tt$n):max(truth$tt$n) identified by the truth table. Default set to ncut=2.
- **neg.out**: [from QCA package] “Logical, use negation of outcome (ignored if data is a truth table object).” Default set to neg.out=F.
- **sim**: number of simulations to run for each combination of parameters. The final number of simulations is length(inclcut)*length(ncut)*sim*2. Default set to sim=10.
- **verbose**: prints the system time used to run the simulation and the percent complete. Default set to verbose=T.

Value

Significance levels reached (.10,.05, .01, .001) when specifying a combination of inclcut, ncut, and neg.out in a QCA model.
Examples

data(rallies)
P<-rallies$P
R<-rallies$R
C<-rallies$C
U<-rallies$U

qca.data<-data.frame(P,R,C,U)
rownames(qca.data)<-rownames(rallies)
truth<-truthTable(qca.data,outcome="P",sort.by="incl",incl.cut=0.7,show.cases=TRUE)
truth
mod1 <- minimize(truth,details=TRUE,show.cases=TRUE)
mod1

brQCA(qca.data,outcome="P",ncut=1,sim=1)

---

conf. table

Configuration Table

Description

Internal function; calculates via logistic regression the output of the Bootstrapped Robustness Recommendation

Usage

conf. table(data, ncut = 4)

Arguments

data name of the model object; the table of solutions for an application of QCA. Default set to data.
ncut configurational n levels for inclusion. Default set to ncut=4

Value

The output of the Bootstrapped Recommendation #’@export
QCAdiff

QCA Case Difference

Description

Provides a data frame of all cases removed from the final QCA model object, after applying recommendations from brQCA.

Usage

QCAdiff(x, y, show = FALSE)

Arguments

x  
name of one QCA model object.

y  
name of a second QCA model object.

show  
Logical, use to show the cases in the solution set for each QCA model object. Default set to show=F.

Value

Shows the cases excluded/removed from the final, more robust QCA model object.

Examples

data(rallies)
P<-rallies$P
R<-rallies$R
C<-rallies$C
B<-rallies$B

qca.data<-data.frame(P,R,C,B)
rownames(qca.data)<-rownames(rallies)
truth<-truthTable(qca.data,outcome="P",sort.by="incl",incl.cut1=0.2,show.cases=TRUE,n.cut=1)
mod1<-minimize(truth,details=TRUE,show.cases=TRUE)
mod1

truth2<-truthTable(qca.data,outcome="P",sort.by="incl",incl.cut1=0.7,show.cases=TRUE,n.cut=3)
mod2<-minimize(truth2,details=TRUE,show.cases=TRUE)
mod2

QCAdiff(mod1,mod2,show=FALSE)
rallies  

*Tea Party Rallies in Florida Counties*

**Description**

This data set gives Census, voting, religion, and Tea Party organization and rallies for 67 counties in Florida.

**Usage**

rallies

**Format**

A matrix containing 67 observations and 13 variables.

**Source**

Subset of data created by Rory McVeigh, Kraig Beyerlein, Burrel Vann Jr., and Priyamvada Trivedi

**References**


---

**sim.brQCA**  

*Simulation Application*

**Description**

Internal function to calculate the Bootstrapped Recommendation.

**Usage**

```r
sim.brQCA(qca.data, outcome = "OUT", conditions = c(""), sim = 10, ncut = 2, type = "crisp", inclcut = "", neg.out = F, verbose = T)
```
Arguments

- **qca.data**: the data frame of causal conditions.
- **outcome**: the outcome variable (object name) in the QCA data frame of causal conditions; "OUT" is the outcome variable for an application of QCA. Default set to `outcome="OUT"`.
- **conditions**: a set of causal conditions. Default set to `conditions=c("")`.
- **sim**: number of simulations to run. Default set to `sim=10`.
- **ncut**: configurational n levels for inclusion. Default set to `ncut=2`.
- **type**: type of QCA application, "crisp" or "fuzzy" sets. Default set to `type = "crisp"`.
- **inclcut**: minimum sufficiency score for inclusion. Default set to `inclcut=""`.
- **neg.out**: [from QCA package] “Logical, use negation of outcome (ignored if data is a truth table object).” Default set to `neg.out=F`.
- **verbose**: prints the system time used to run the simulation and the percent complete. Default set to `verbose=T`.

Value

Simulation information later passed on to conf.table.
Index

+Topic **datasets**
  rallies, 6

baQCA, 2
brQCA, 3
conf.table, 4
QCAdiff, 5
rallies, 6
sim.brQCA, 6