

Package ‘rCBA’

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Title CBA Classifier

Version 0.4.3

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URL <https://github.com/jaroslav-kuchar/rCBA>

BugReports <https://github.com/jaroslav-kuchar/rCBA/issues>

Description Provides implementations of a classifier based on the
``Classification Based on Associations" (CBA). It can be used for building
classification models from association rules. Rules are pruned in the order of
precedence given by the sort criteria and a default rule is added. The final
classifier labels provided instances. CBA was originally proposed by Liu,
B. Hsu, W. and Ma, Y. Integrating Classification and Association Rule
Mining. Proceedings KDD-98, New York, 27-31 August. AAAI. pp80-86 (1998, ISBN:1-57735-
070-7).

Depends R (>= 3.1.3), rJava, arules

Imports R.utils, TunePareto, methods, stats, utils

License Apache License (== 2.0)

LazyData true

SystemRequirements Java (>= 8)

RoxygenNote 6.1.1

Encoding UTF-8

Collate 'init.R' 'build.R' 'buildFPGrowth.R' 'classification.R'
'fpgrowth.R' 'pruning.R' 'utils.R'

NeedsCompilation no

Repository CRAN

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build	<i>Build classifier function (Apriori-based)</i>
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Description

Automatic build of the classification model using the Apriori algorithm from the arules

Usage

```
build(trainData, className = NA, pruning = TRUE, sa = list(),
      verbose = TRUE, parallel = TRUE)
```

Arguments

trainData	data.frame or transactions from arules with input data
className	column name with the target class - default is the last column
pruning	performing pruning while building the model
sa	simulated annealing setting. Default values: list(temp=100.0, alpha=0.05, tabu-RuleLength=5, timeout=10)
verbose	verbose indicator
parallel	parallel indicator

Value

list with parameters and model as data.frame with rules

Examples

```
library("rCBA")
data("iris")

output <- rCBA::build(iris,sa = list(alpha=0.5), parallel=FALSE) # speeding up the cooling
model <- output$model

predictions <- rCBA::classification(iris, model)
table(predictions)
sum(as.character(iris$Species)==as.character(predictions), na.rm=TRUE) / length(predictions)
```

buildFPGrowth	<i>Build classifier function (FP-Growth-based)</i>
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Description

Automatic build of the classification model using the FP-Growth algorithm

Usage

```
buildFPGrowth(train, className = NULL, verbose = TRUE,  
              parallel = TRUE)
```

Arguments

train	data.frame or transactions from arules with input data
className	column name with the target class - default is the last column
verbose	verbose indicator
parallel	parallel indicator

Value

list with parameters and model as data.frame with rules

Examples

```
library("rCBA")  
data("iris")  
  
output <- rCBA::buildFPGrowth(iris[sample(nrow(iris), 10),], "Species",  
                             parallel=FALSE, verbose=TRUE)  
inspect(output$model)
```

classification	<i>A classification function</i>
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Description

A classification function

Usage

```
classification(test, rules, verbose = TRUE)
```

Arguments

test	data.frame or transactions from arules with input data
rules	data.frame with rules
verbose	verbose indicator

Value

vector with classifications

Examples

```
library("arules")
library("rCBA")
data("iris")

train <- sapply(iris, as.factor)
train <- data.frame(train, check.names=FALSE)
txns <- as(train,"transactions")

rules = apriori(txns, parameter=list(support=0.03, confidence=0.03, minlen=2),
appearance = list(rhs=c("Species=setosa", "Species=versicolor", "Species=virginica"),default="lhs"))

predictions <- rCBA::classification(train,rules)
table(predictions)
sum(as.character(train$Species)==as.character(predictions),na.rm=TRUE)/length(predictions)
```

fpgrowth

FP-Growth

Description

FP-Growth algorithm - Jiawei Han, Jian Pei, and Yiwen Yin. Mining frequent patterns without candidate generation. SIGMOD Rec. 29, 2 (2000) <doi:10.1145/335191.335372>

Usage

```
fpgrowth(train, support = 0.01, confidence = 1, maxLength = 5,
consequent = NULL, verbose = TRUE, parallel = TRUE)
```

Arguments

train	data.frame or transactions from arules with input data
support	minimum support
confidence	minimum confidence
maxLength	maximum length
consequent	filter consequent - column name with consequent/target class
verbose	verbose indicator
parallel	parallel indicator

Examples

```
library("rCBA")
data("iris")

train <- sapply(iris, as.factor)
train <- data.frame(train, check.names=FALSE)
txns <- as(train, "transactions")

rules = rCBA::fpgrowth(txns, support=0.03, confidence=0.03, maxLength=2, consequent="Species",
                      parallel=FALSE)

predictions <- rCBA::classification(train, rules)
table(predictions)
sum(as.character(train$Species) == as.character(predictions), na.rm=TRUE) / length(predictions)

prunedRules <- rCBA::pruning(train, rules, method="m2cba", parallel=FALSE)
predictions <- rCBA::classification(train, prunedRules)
table(predictions)
sum(as.character(train$Species) == as.character(predictions), na.rm=TRUE) / length(predictions)
```

frameToRules

Conversion of data.frame to rules from arules

Description

Conversion of data.frame to rules from arules

Usage

```
frameToRules(model)
```

Arguments

model data.frame with rules

Value

arules rules representation

Examples

```
library("rCBA")

model <- data.frame("rules" = c("{X=1} => {Y=1}", "{X=0} => {Y=0}"),
                   "support" = c(0.5, 0.5),
                   "confidence" = c(0.5, 0.5),
                   "lift" = c(1.0, 1.0))

rules <- rCBA::frameToRules(model)
```

```
inspect(rules)
```

pruning

A Pruning function

Description

A Pruning function

Usage

```
pruning(train, rules, method = "m2cba", verbose = TRUE,
        parallel = TRUE)
```

Arguments

train	trainData data.frame or transactions from arules with input data
rules	data.frame with rules
method	pruning method m2cba(default) m1cbaldcbrcba
verbose	verbose indicator
parallel	parallel indicator

Value

data.frame with pruned rules

Examples

```
library("arules")
library("rCBA")
data("iris")

train <- sapply(iris, as.factor)
train <- data.frame(train, check.names=FALSE)
txns <- as(train, "transactions")

rules = apriori(txns, parameter=list(support=0.03, confidence=0.03, minlen=2),
appearance = list(rhs=c("Species=setosa", "Species=versicolor", "Species=virginica"), default="lhs"))

print(length(rules))
prunedRules <- rCBA::pruning(train, rules, method="m2cba", parallel=FALSE)
print(length(prunedRules))
```

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