

Package ‘kernelFactory’

July 2, 2014

Type Package

Title Kernel Factory: An ensemble of kernel Machines

Version 0.2.0

Date 2014-03-23

Imports randomForest, AUC, genalg, kernlab

Author Michel Ballings, Dirk Van den Poel

Maintainer Michel Ballings <Michel.Ballings@GMail.com>

Description Classification based on an ensemble of kernel machines

License GPL (>= 2)

NeedsCompilation no

Repository CRAN

Date/Publication 2014-03-23 18:36:47

R topics documented:

Credit	2
kernelFactory	2
kFNews	4
predict.kernelFactory	5
Index	7

Credit

Credit approval (Frank and Asuncion, 2010)

Description

Credit contains credit card applications. The dataset has a good mix of continuous and categorical features.

Usage

```
data(Credit)
```

Format

A data frame with 653 observations, 15 predictors and a binary criterion variable called Response

Details

All observations with missing values are deleted.

Source

Frank, A. and Asuncion, A. (2010). UCI Machine Learning Repository [<http://archive.ics.uci.edu/ml>]. Irvine, CA: University of California, School of Information and Computer Science.

References

The original dataset can be downloaded at <http://archive.ics.uci.edu/ml/datasets/Credit+Approval>

Examples

```
data(Credit)
str(Credit)
table(Credit$Response)
```

kernelFactory*Binary classification with Kernel Factory*

Description

kernelFactory implements an ensemble method for kernel machines (Ballings and Van den Poel, 2013).

Usage

```
kernelFactory(x = NULL, y = NULL, cp = 1, rp = round(log(nrow(x), 10)),
  method = "burn", ntree = 500, popSize = rp * cp * 7, iters = 80,
  mutationChance = 1/(rp * cp), elitism = max(1, round((rp * cp) * 0.05)))
```

Arguments

x	A data frame of predictors (numeric, integer or factor). Categorical variables need to be factors.
y	A factor containing the response vector. Only {0,1} is allowed.
cp	The number of column partitions.
rp	The number of row partitions.
method	Can be one of the following: POLynomial kernel function (pol), LINear kernel function (lin), Radial Basis kernel Function rbf), random choice (random=pol, lin, rbf) (random), burn- in choice of best function (burn=pol, lin, rbf) (burn). Use random or burn if you don't know in advance which kernel function is best.
ntree	Number of trees in the Random Forest base classifiers.
popSize	Population size of the genetic algorithm.
iters	Number of generations of the genetic algorithm.
mutationChance	Mutationchance of the genetic algorithm.
elitism	Elitism parameter of the genetic algorithm.

Value

An object of class kernelFactory, which is a list with the following elements:

trn	Training data set.
trn1st	List of training partitions.
rbfstre	List of used kernel functions.
rbfmtrX	List of augmented kernel matrices.
rsltsKF	List of models.
cpr	Number of column partitions.
rpr	Number of row partitions.
cntr	Number of partitions.
wghts	Weights of the ensemble members.
nmDtrn	Vector indicating the numeric (and integer) features.
rngs	Ranges of numeric predictors.

Author(s)

Authors: Michel Ballings and Dirk Van den Poel, Maintainer: <Michel.Ballings@GMail.com>

References

Ballings, M. and Van den Poel, D. (2013), Kernel Factory: An Ensemble of Kernel Machines. Expert Systems With Applications, 40(8), 2904-2913.

See Also

[predict.kernelFactory](#)

Examples

```
#Credit Approval data available at UCI Machine Learning Repository
data(Credit)
#take subset (for the purpose of a quick example) and train and test
Credit <- Credit[1:100,]
train.ind <- sample(nrow(Credit),round(0.5*nrow(Credit)))

#Train Kernel Factory on training data
kFmodel <- kernelFactory(x=Credit[train.ind,names(Credit)!= "Response"],
                        y=Credit[train.ind,"Response"], method=random)

#Deploy Kernel Factory to predict response for test data
#predictedresponse <- predict(kFmodel, newdata=Credit[-train.ind,names(Credit)!= "Response"])
```

kFNews

Display the NEWS file

Description

kFNews shows the NEWS file of the kernelFactory package.

Usage

```
kFNews()
```

Value

None.

Author(s)

Authors: Michel Ballings and Dirk Van den Poel, Maintainer: <Michel.Ballings@GMail.com>

References

Ballings, M. and Van den Poel, D. (2013), Kernel Factory: An Ensemble of Kernel Machines. Expert Systems With Applications, 40(8), 2904-2913.

See Also

[kernelFactory](#), [predict.kernelFactory](#)

Examples

```
kFNews()
```

`predict.kernelFactory` *Predict method for kernelFactory objects*

Description

Prediction of new data using `kernelFactory`.

Usage

```
## S3 method for class 'kernelFactory'  
predict(object, newdata = NULL, ...)
```

Arguments

<code>object</code>	An object of class <code>kernelFactory</code> , as created by the function <code>kernelFactory</code>
<code>newdata</code>	A data frame with the same predictors as in the training data.
<code>...</code>	Not used currently.

Value

A vector containing the response probabilities.

Author(s)

Authors: Michel Ballings and Dirk Van den Poel, Maintainer: <Michel.Ballings@GMail.com>

References

Ballings, M. and Van den Poel, D. (2013), Kernel Factory: An Ensemble of Kernel Machines. Expert Systems With Applications, 40(8), 2904-2913.

See Also

[kernelFactory](#)

Examples

```
#Credit Approval data available at UCI Machine Learning Repository
data(Credit)
#take subset (for the purpose of a quick example) and train and test
Credit <- Credit[1:100,]
train.ind <- sample(nrow(Credit),round(0.5*nrow(Credit)))

#Train Kernel Factory on training data
kFmodel <- kernelFactory(x=Credit[train.ind,names(Credit)!= "Response"],
                        y=Credit[train.ind,"Response"], method=random)

#Deploy Kernel Factory to predict response for test data
predictedresponse <- predict(kFmodel, newdata=Credit[-train.ind,names(Credit)!= "Response"])
```

Index

*Topic **classification**

kernelFactory, [2](#)

predict.kernelFactory, [5](#)

*Topic **datasets**

Credit, [2](#)

Credit, [2](#)

kernelFactory, [2](#), [5](#)

kFNews, [4](#)

predict.kernelFactory, [4](#), [5](#), [5](#)