Package: OOBCurve (via r-universe)

August 21, 2024

Type Package

Title Out of Bag Learning Curve

Description Provides functions to calculate the out-of-bag learning curve for random forests for any measure that is available in the 'mlr' package. Supported random forest packages are 'randomForest' and 'ranger' and trained models of these packages with the train function of 'mlr'. The main function is OOBCurve() that calculates the out-of-bag curve depending on the number of trees. With the OOBCurvePars() function out-of-bag curves can also be calculated for 'mtry', 'sample.fraction' and 'min.node.size' for the 'ranger' package.

URL https://github.com/PhilippPro/OOBCurve

BugReports https://github.com/PhilippPro/OOBCurve/issues

License GPL-3

Encoding UTF-8

Depends R (>= 3.3.3), mlr (>= 2.11)

Imports randomForest, ranger

LazyData yes

ByteCompile yes

Version 0.3

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Suggests testthat

Repository https://philipppro.r-universe.dev

RemoteUrl https://github.com/philipppro/oobcurve

RemoteRef HEAD

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Contents

`OOBCurve` *Out of Bag Learning curve*

Description

With the help of this function the out of bag learning curve for random forests can be created for any measure that is available in the mlr package.

Usage

```
OOBCurve(mod, measures = list(auc), task, data)
```

Arguments

`mod`	An object of class `randomForest` or `ranger`, as that created by the function `randomForest`/`ranger` with option `keep.inbag = TRUE`. Alternatively you can also use a randomForest or ranger model trained with `train` of mlr.
`measures`	List of performance measure(s) of mlr to evaluate. Default is auc only. See the mlr tutorial for a list of available measures for the corresponding task.
`task`	Learning task created by the function `makeClassifTask` or `makeRegrTask` of mlr.
`data`	Original data that was used for training the random forest.

Value

Returns a dataframe with a column for each desired measure.

See Also

`OOBCurvePars` for out-of-bag curves of other parameters.

Examples

```
library(mlr)
library(ranger)

# Classification
data = getTaskData(sonar.task)
sonar.task = makeClassifTask(data = data, target = "Class")
lrn = makeLearner("classif.ranger", keep.inbag = TRUE, par.vals = list(num.trees = 100))
mod = train(lrn, sonar.task)
```

```
# Alternatively use ranger directly
# mod = ranger(Class ~., data = data, num.trees = 100, keep.inbag = TRUE)
# Alternatively use randomForest
# mod = randomForest(Class ~., data = data, ntree = 100, keep.inbag = TRUE)

# Application of the main function
results = OOBCurve(mod, measures = list(mmce, auc, brier), task = sonar.task, data = data)
# Plot the generated results
plot(results$mmce, type = "l", ylab = "oob-mmce", xlab = "ntrees")
plot(results$auc, type = "l", ylab = "oob-auc", xlab = "ntrees")
plot(results$brier, type = "l", ylab = "oob-brier-score", xlab = "ntrees")

# Regression
data = getTaskData(bh.task)
bh.task = makeRegrTask(data = data, target = "medv")
lrn = makeLearner("regr.ranger", keep.inbag = TRUE, par.vals = list(num.trees = 100))
mod = train(lrn, bh.task)

# Application of the main function
results = OOBCurve(mod, measures = list(mse, mae, rsq), task = bh.task, data = data)
# Plot the generated results
plot(results$mse, type = "l", ylab = "oob-mse", xlab = "ntrees")
plot(results$mae, type = "l", ylab = "oob-mae", xlab = "ntrees")
plot(results$rsq, type = "l", ylab = "oob-mae", xlab = "ntrees")
```

OOBCurvePars *OOBCurvePars*

Description

With the help of this function the out of bag curves for parameters like mtry, sample.fraction and min.node.size of random forests can be created for any measure that is available in the mlr package.

Usage

```
OOBCurvePars(lrn, task, pars = c("mtry"), nr.grid = 10, par.vals = NULL,
  measures = list(auc))
```

Arguments

lrn	The learner created with makeLearner. Currently only ranger is supported. num.trees has to be set sufficiently high to produce smooth curves.
task	Learning task created by the function makeClassifTask or makeRegrTask of mlr.
pars	One of the hyperparameter "mtry", "sample.fraction" or "min.node.size".
nr.grid	Number of points on hyperparameter space that should be evaluated (distributed equally)

par.vals	Optional vector of hyperparameter points that should be evaluated. If set, nr.grid is not used anymore. Default is NULL.
measures	List of performance measure(s) of mlr to evaluate. Default is mmce for classification and mse for regression. See the mlr tutorial for a list of available measures for the corresponding task.

Value

Returns a list with parameter values and a list of performances.

See Also

OOBCurve for out-of-bag curves dependent on the number of trees.

Examples

```
## Not run:
library(mlr)
task = sonar.task

lrn = makeLearner("classif.ranger", predict.type = "prob", num.trees = 1000)
results = OOBCurvePars(lrn, task, measures = list(auc))
plot(results$par.vals, results$performances$auc, type = "l", xlab = "mtry", ylab = "auc")

lrn = makeLearner("classif.ranger", predict.type = "prob", num.trees = 1000, replace = FALSE)
results = OOBCurvePars(lrn, task, pars = "sample.fraction", measures = list(mmce))
plot(results$par.vals, results$performances$mmce, type = "l", xlab = "sample.fract.", ylab = "mmce")

results = OOBCurvePars(lrn, task, pars = "min.node.size", measures = list(mmce))
plot(results$par.vals, results$performances$mmce, type = "l", xlab = "min.node.size", ylab = "mmce")
## End(Not run)
```

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