Package 'mlr3learners'

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Title Recommended Learners for 'mlr3'

Version 0.1.6

Description Recommended Learners for 'mlr3'. Extends 'mlr3' with interfaces to essential machine learning packages on CRAN. This includes, but is not limited to: (penalized) linear and logistic regression, linear and quadratic discriminant analysis, k-nearest neighbors, naive Bayes, support vector machines, and gradient boosting.

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URL https://mlr3learners.mlr-org.com, https://github.com/mlr-org/mlr3learners

BugReports https://github.com/mlr-org/mlr3learners/issues

Depends R (>= 3.1.0)

Imports data.table, mlr3 (>= 0.1.4), mlr3misc (>= 0.1.7), paradox, R6

Suggests bibtex, checkmate, DiceKriging, e1071, glmnet, kknn, lgr, MASS, ranger, testthat, xgboost

RdMacros mlr3misc

Encoding UTF-8

NeedsCompilation no

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R topics documented:

`mlr3learners-package` *mlr3learners: Recommended Learners for 'mlr3'*

Description

More learners are available in the `mlr3learners` repository on Github (https://github.com/mlr3learners). There also is a wiki page listing all currently available custom learners (https://github.com/mlr-org/mlr3learners/wiki/Extra-Learners). A guide on how to create custom learners is covered in the book: https://mlr3book.mlr-org.com. Feel invited to contribute a missing learner to the **mlr3** ecosystem!

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See Also

Useful links:

- https://mlr3learners.mlr-org.com
- https://github.com/mlr-org/mlr3learners
- Report bugs at https://github.com/mlr-org/mlr3learners/issues

mlr_learners_classif.glmnet

GLM with Elastic Net Regularization Classification Learner

Description

Generalized linear models with elastic net regularization. Calls `glmnet::cv.glmnet()` from package **glmnet**.

Format

`R6::R6Class()` inheriting from mlr3::LearnerClassif.

Construction

```
LearnerClassifGlmnet$new()
mlr3::mlr_learners$get("classif.glmnet")
mlr3::lrn("classif.glmnet")
```

References

Friedman J, Hastie T, Tibshirani R (2010). "Regularization Paths for Generalized Linear Models via Coordinate Descent." *Journal of Statistical Software*, **33**(1), 1–22. doi: 10.18637/jss.v033.i01.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("classif.glmnet")
print(learner)

# available parameters:
learner$param_set$ids()
```

mlr_learners_classif.kknn

k-Nearest-Neighbor Classification Learner

Description

k-Nearest-Neighbor classification. Calls `kknn::kknn()` from package **kknn**.

Format

`R6::R6Class()` inheriting from mlr3::LearnerClassif.

Construction

```
LearnerClassifKKNN$new()
mlr3::mlr_learners$get("classif.kknn")
mlr3::lrn("classif.kknn")
```

References

Hechenbichler K, Schliep K (2004). "Weighted k-nearest-neighbor techniques and ordinal classification." Technical Report Discussion Paper 399, SFB 386, Ludwig-Maximilians University Munich. doi: 10.5282/ubm/epub.1769.

Samworth RJ (2012). "Optimal weighted nearest neighbour classifiers." *The Annals of Statistics*, **40**(5), 2733–2763. doi: 10.1214/12AOS1049.

Cover T, Hart P (1967). "Nearest neighbor pattern classification." *IEEE transactions on information theory*, **13**(1), 21–27. doi: 10.1109/TIT.1967.1053964.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("classif.kknn")
print(learner)

# available parameters:
learner$param_set$ids()
```

---

mlr_learners_classif.lda

Linear Discriminant Analysis Classification Learner

Description

Linear discriminant analysis. Calls `MASS::lda()` from package **MASS**.

Format

`R6::R6Class()` inheriting from mlr3::LearnerClassif.

Construction

```
LearnerClassifLDA$new()
mlr3::mlr_learners$get("classif.lda")
mlr3::lrn("classif.lda")
```

References

Venables WN, Ripley BD (2002). *Modern Applied Statistics with S*, Fourth edition. Springer, New York. ISBN 0-387-95457-0, http://www.stats.ox.ac.uk/pub/MASS4.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("classif.lda")
print(learner)

# available parameters:
learner$param_set$ids()
```

`mlr_learners_classif.log_reg`

Logistic Regression Classification Learner

Description

Classification via logistic regression. Calls `stats::glm()`.

Format

`R6::R6Class()` inheriting from mlr3::LearnerClassif.

Construction

```
LearnerClassifLogReg$new()
mlr3::mlr_learners$get("classif.log_reg")
mlr3::lrn("classif.log_reg")
```

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("classif.log_reg")
print(learner)

# available parameters:
learner$param_set$ids()
```

mlr_learners_classif.naive_bayes

Naive Bayes Classification Learner

Description

Naive Bayes classification. Calls `e1071::naiveBayes()` from package **e1071**.

Format

`R6::R6Class()` inheriting from mlr3::LearnerClassif.

Construction

```
LearnerClassifNaiveBayes$new()
mlr3::mlr_learners$get("classif.naive_bayes")
mlr3::lrn("classif.naive_bayes")
```

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("classif.naive_bayes")
print(learner)

# available parameters:
learner$param_set$ids()
```

mlr_learners_classif.qda

Quadratic Discriminant Analysis Classification Learner

Description

Quadratic discriminant analysis. Calls `MASS::qda()` from package **MASS**.

Format

`R6::R6Class()` inheriting from mlr3::LearnerClassif.

Construction

```
LearnerClassifQDA$new()
mlr3::mlr_learners$get("classif.qda")
mlr3::lrn("classif.qda")
```

References

Venables WN, Ripley BD (2002). *Modern Applied Statistics with S*, Fourth edition. Springer, New York. ISBN 0-387-95457-0, http://www.stats.ox.ac.uk/pub/MASS4.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("classif.qda")
print(learner)

# available parameters:
learner$param_set$ids()
```

`mlr_learners_classif.ranger`
Ranger Classification Learner

Description

Random classification forest. Calls `ranger::ranger()` from package **ranger**.

Format

`R6::R6Class()` inheriting from mlr3::LearnerClassif.

Construction

```
LearnerClassifRanger$new()
mlr3::mlr_learners$get("classif.ranger")
mlr3::lrn("classif.ranger")
```

References

Wright MN, Ziegler A (2017). "ranger: A Fast Implementation of Random Forests for High Dimensional Data in C++ and R." *Journal of Statistical Software*, **77**(1), 1–17. doi: 10.18637/jss.v077.i01.

Breiman L (2001). "Random Forests." *Machine Learning*, **45**(1), 5–32. ISSN 1573-0565, doi: 10.1023/A:1010933404324.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("classif.ranger")
print(learner)

# available parameters:
learner$param_set$ids()
```

`mlr_learners_classif.svm` *Support Vector Machine*

Description

A learner for a classification support vector machine implemented in `e1071::svm()`.

Format

`R6::R6Class()` inheriting from mlr3::LearnerClassif.

Construction

```
LearnerClassifSVM$new()
mlr3::mlr_learners$get("classif.svm")
mlr3::lrn("classif.svm")
```

References

Cortes C, Vapnik V (1995). "Support-vector networks." *Machine Learning*, **20**(3), 273–297. doi: 10.1007/BF00994018.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("classif.svm")
print(learner)

# available parameters:
learner$param_set$ids()
```

`mlr_learners_classif.xgboost`
Extreme Gradient Boosting Classification Learner

Description

eXtreme Gradient Boosting classification. Calls `xgboost::xgb.train()` from package **xgboost**.

We changed the following defaults for this learner:

- Verbosity is reduced by setting `verbose` to `0`.
- Number of boosting iterations `nrounds` is set to `1`.

Format

`R6::R6Class()` inheriting from mlr3::LearnerClassif.

Construction

```
LearnerClassifXgboost$new()
mlr3::mlr_learners$get("classif.xgboost")
mlr3::lrn("classif.xgboost")
```

References

Chen T, Guestrin C (2016). "Xgboost: A scalable tree boosting system." In *Proceedings of the 22nd ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, 785–794. ACM. doi: 10.1145/2939672.2939785.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("classif.xgboost")
print(learner)

# available parameters:
learner$param_set$ids()
```

`mlr_learners_regr.glmnet`

GLM with Elastic Net Regularization Regression Learner

Description

Generalized linear models with elastic net regularization. Calls `glmnet::cv.glmnet()` from package **glmnet**.

The default for hyperparameter `family` is changed to `"gaussian"`.

Format

`R6::R6Class()` inheriting from mlr3::LearnerRegr.

Construction

```
LearnerRegrGlmnet$new()
mlr3::mlr_learners$get("regr.glmnet")
mlr3::lrn("regr.glmnet")
```

References

Friedman J, Hastie T, Tibshirani R (2010). "Regularization Paths for Generalized Linear Models via Coordinate Descent." *Journal of Statistical Software*, **33**(1), 1–22. doi: 10.18637/jss.v033.i01.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("regr.glmnet")
print(learner)

# available parameters:
learner$param_set$ids()
```

`mlr_learners_regr.kknn`

k-Nearest-Neighbor Regression Learner

Description

k-Nearest-Neighbor regression. Calls `kknn::kknn()` from package **kknn**.

Format

R6::R6Class() inheriting from mlr3::LearnerRegr.

Construction

```
LearnerRegrKKNN$new()
mlr3::mlr_learners$get("regr.kknn")
mlr3::lrn("regr.kknn")
```

References

Hechenbichler K, Schliep K (2004). "Weighted k-nearest-neighbor techniques and ordinal classification." Technical Report Discussion Paper 399, SFB 386, Ludwig-Maximilians University Munich. doi: 10.5282/ubm/epub.1769.

Samworth RJ (2012). "Optimal weighted nearest neighbour classifiers." *The Annals of Statistics*, **40**(5), 2733–2763. doi: 10.1214/12AOS1049.

Cover T, Hart P (1967). "Nearest neighbor pattern classification." *IEEE transactions on information theory*, **13**(1), 21–27. doi: 10.1109/TIT.1967.1053964.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("regr.kknn")
print(learner)

# available parameters:
learner$param_set$ids()
```

---

mlr_learners_regr.km *Kriging Regression Learner*

Description

Kriging regression. Calls DiceKriging::km() from package **DiceKriging**.

- The predict type hyperparameter "type" defaults to "SK" (simple Kriging).
- The additional hyperparameter `nugget.stability` is used to overwrite the hyperparameter `nugget` with `nugget.stability * var(y)` before training to improve the numerical stability. We recommend a value of `1e-8`.
- The additional hyperparameter `jitter` can be set to add N(0, [jitter])-distributed noise to the data before prediction to avoid perfect interpolation. We recommend a value of `1e-12`.

Format

R6::R6Class() inheriting from mlr3::LearnerRegr.

Construction

```
LearnerRegrKM$new()
mlr3::mlr_learners$get("regr.km")
mlr3::lrn("regr.km")
```

References

Roustant O, Ginsbourger D, Deville Y (2012). "DiceKriging, DiceOptim: Two R Packages for the Analysis of Computer Experiments by Kriging-Based Metamodeling and Optimization." *Journal of Statistical Software*, **51**(1), 1–55. doi: 10.18637/jss.v051.i01.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("regr.km")
print(learner)

# available parameters:
learner$param_set$ids()
```

---

mlr_learners_regr.lm *Linear Model Regression Learner*

Description

Ordinary linear regression. Calls stats::lm().

Format

R6::R6Class() inheriting from mlr3::LearnerRegr.

Construction

```
LearnerRegrLM$new()
mlr3::mlr_learners$get("regr.lm")
mlr3::lrn("regr.lm")
```

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("regr.lm")
print(learner)

# available parameters:
learner$param_set$ids()
```

`mlr_learners_regr.ranger`

Ranger Regression Learner

Description

Random regression forest. Calls `ranger::ranger()` from package **ranger**.

Format

`R6::R6Class()` inheriting from mlr3::LearnerClassif.

Construction

```
LearnerRegrRanger$new()
mlr3::mlr_learners$get("regr.ranger")
mlr3::lrn("regr.ranger")
```

References

Wright MN, Ziegler A (2017). "ranger: A Fast Implementation of Random Forests for High Dimensional Data in C++ and R." *Journal of Statistical Software*, **77**(1), 1–17. doi: 10.18637/jss.v077.i01.

Breiman L (2001). "Random Forests." *Machine Learning*, **45**(1), 5–32. ISSN 1573-0565, doi: 10.1023/A:1010933404324.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("regr.ranger")
print(learner)

# available parameters:
learner$param_set$ids()
```

mlr_learners_regr.svm *Support Vector Machine*

Description

A learner for a regression support vector machine implemented in `e1071::svm()`.

Format

`R6::R6Class()` inheriting from mlr3::LearnerRegr.

Construction

```
LearnerRegrSVM$new()
mlr3::mlr_learners$get("regr.svm")
mlr3::lrn("regr.svm")
```

References

Cortes C, Vapnik V (1995). "Support-vector networks." *Machine Learning*, **20**(3), 273–297. doi: 10.1007/BF00994018.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("regr.svm")
print(learner)

# available parameters:
learner$param_set$ids()
```

mlr_learners_regr.xgboost *Extreme Gradient Boosting Regression Learner*

Description

eXtreme Gradient Boosting regression. Calls `xgboost::xgb.train()` from package **xgboost**.

We changed the following defaults for this learner:

- Verbosity is reduced by setting `verbose` to `0`.
- Number of boosting iterations `nrounds` is set to `1`.

Format

R6::R6Class() inheriting from mlr3::LearnerRegr.

Construction

```
LearnerRegrXgboost$new()
mlr3::mlr_learners$get("regr.xgboost")
mlr3::lrn("regr.xgboost")
```

References

Chen T, Guestrin C (2016). "Xgboost: A scalable tree boosting system." In *Proceedings of the 22nd ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, 785–794. ACM. doi: 10.1145/2939672.2939785.

See Also

Dictionary of Learners: mlr3::mlr_learners

Examples

```
learner = mlr3::lrn("regr.xgboost")
print(learner)

# available parameters:
learner$param_set$ids()
```

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