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Machine Learning

Session 21 - PL

Ensemble Learning and Hyperparameter Optimization

Ciência de Dados Aplicada

2023/2024

Ensemble Learning with Scikit-Learn

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- Bagging:
- https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.BaggingClassifier.html

sklearn.ensemble.BaggingClassifier

class sklearn.ensemble.**BaggingClassifier**(*estimator=None, n_estimators=10, *, max_samples=1.0, max_features=1.0, bootstrap=True, bootstrap_features=False, oob_score=False, warm_start=False, n_jobs=None, random_state=None, verbose=0*)
[source]

- https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.BaggingRegressor.html

sklearn.ensemble.BaggingRegressor

class sklearn.ensemble.**BaggingRegressor**(*estimator=None, n_estimators=10, *, max_samples=1.0, max_features=1.0, bootstrap=True, bootstrap_features=False, oob_score=False, warm_start=False, n_jobs=None, random_state=None, verbose=0*)
[source]

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- Boosting:
- https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.GradientBoostingClassifier.html

sklearn.ensemble.GradientBoostingClassifier

class sklearn.ensemble.**GradientBoostingClassifier**(*, *loss='log_loss'*, *learning_rate=0.1*, *n_estimators=100*, *subsample=1.0*, *criterion='friedman_mse'*, *min_samples_split=2*, *min_samples_leaf=1*, *min_weight_fraction_leaf=0.0*, *max_depth=3*, *min_impurity_decrease=0.0*, *init=None*, *random_state=None*, *max_features=None*, *verbose=0*, *max_leaf_nodes=None*, *warm_start=False*, *validation_fraction=0.1*, *n_iter_no_change=None*, *tol=0.0001*, *ccp_alpha=0.0*)[source]

- https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.GradientBoostingRegressor.html

sklearn.ensemble.GradientBoostingRegressor

class sklearn.ensemble.**GradientBoostingRegressor**(*, *loss='squared_error'*, *learning_rate=0.1*, *n_estimators=100*, *subsample=1.0*, *criterion='friedman_mse'*, *min_samples_split=2*, *min_samples_leaf=1*, *min_weight_fraction_leaf=0.0*, *max_depth=3*, *min_impurity_decrease=0.0*, *init=None*, *random_state=None*, *max_features=None*, *alpha=0.9*, *verbose=0*, *max_leaf_nodes=None*, *warm_start=False*, *validation_fraction=0.1*, *n_iter_no_change=None*, *tol=0.0001*, *ccp_alpha=0.0*)[source]

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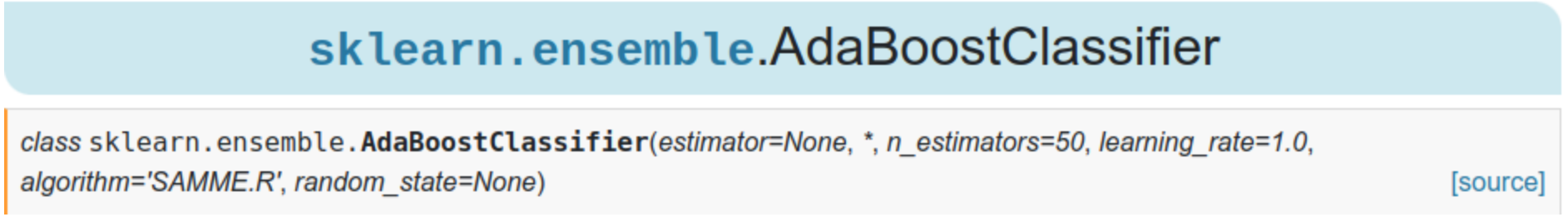
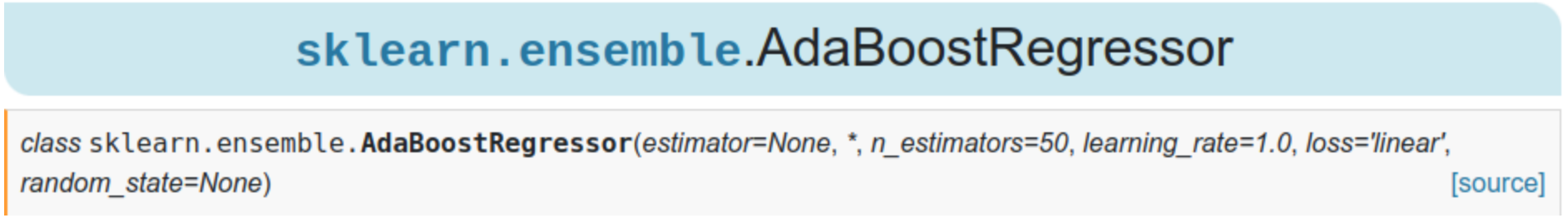
- Boosting:
- https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.AdaBoostClassifier.html



- https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.AdaBoostRegressor.html



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- Stacking:
- https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.StackingClassifier.html

sklearn.ensemble.StackingClassifier

class sklearn.ensemble.**StackingClassifier**(*estimators*, *final_estimator=None*, ***, *cv=None*, *stack_method='auto'*, *n_jobs=None*, *passthrough=False*, *verbose=0*) [source]

- https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.StackingRegressor.html

sklearn.ensemble.StackingRegressor

class sklearn.ensemble.**StackingRegressor**(*estimators*, *final_estimator=None*, ***, *cv=None*, *n_jobs=None*, *passthrough=False*, *verbose=0*) [source]

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- Voting:
- https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.VotingClassifier.html

sklearn.ensemble.VotingClassifier

class sklearn.ensemble.**VotingClassifier**(*estimators*, *, *voting='hard'*, *weights=None*, *n_jobs=None*, *flatten_transform=True*, *verbose=False*) [source]

- https://scikit-learn.org/stable/modules/generated/sklearn.ensemble.VotingRegressor.html

sklearn.ensemble.VotingRegressor

class sklearn.ensemble.**VotingRegressor**(*estimators*, *, *weights=None*, *n_jobs=None*, *verbose=False*) [source]

Hyperparameter Optimization with Scikit-Learn

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- Grid Search:
- https://scikit-learn.org/stable/modules/generated/sklearn.model_selection.GridSearchCV.html

sklearn.model_selection.GridSearchCV

class sklearn.model_selection.**GridSearchCV**(*estimator*, *param_grid*, *, *scoring=None*, *n_jobs=None*, *refit=True*, *cv=None*, *verbose=0*, *pre_dispatch='2*n_jobs'*, *error_score=nan*, *return_train_score=False*) [source]

- Randomized Search:
- https://scikit-learn.org/stable/modules/generated/sklearn.model_selection.RandomizedSearchCV.html

sklearn.model_selection.RandomizedSearchCV

class sklearn.model_selection.**RandomizedSearchCV**(*estimator*, *param_distributions*, *, *n_iter=10*, *scoring=None*, *n_jobs=None*, *refit=True*, *cv=None*, *verbose=0*, *pre_dispatch='2*n_jobs'*, *random_state=None*, *error_score=nan*, *return_train_score=False*) [source]

Exercises:

- Notebooks on the github repository:
  - Notebook with exercises:
    - Notebooks/session_21/exercises.ipynb