

Base

mod base

Definition of BaseAutoCV.

class BaseAutoCV

Bases: `ABC`, `BaseEstimator`

Defines BaseAutoCV, a class to help fit models using Bayesian optimization.

Source code in `src/tree_machine/base.py`



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attr **cv_results** property

```
cv_results
```

Returns test score for each fold for the model best estimator.

attr **scorer** abstractmethod property

```
scorer
```

Abstract implementation for a function that returns the correct scorer to use when fitting/scoring models.

meth **__init__**

```
__init__(metric, cv, n_trials, timeout)
```

Constructor for BaseAutoTreeCV.

Parameters:

Name	Type	Description	Default
<code>metric</code>	<code>str</code>	Loss metric to use as base for estimation process.	<i>required</i>
<code>cv</code>	<code>BaseCrossValidator</code>	Splitter object to use when estimating the model.	<i>required</i>
<code>n_trials</code>	<code>NonNegativeInt</code>	Number of optimization trials to use when finding a model.	<i>required</i>
<code>timeout</code>	<code>NonNegativeInt</code>	Timeout in seconds to stop the optimization.	<i>required</i>

” Source code in `src/tree_machine/base.py`

```
38 | @validate_call(config={"arbitrary_types_allowed": True})
39 | def __init__(
40 |     self,
41 |     metric: str,
42 |     cv: BaseCrossValidator,
43 |     n_trials: NonNegativeInt,
44 |     timeout: NonNegativeInt,
45 | ) -> None:
46 |     """
47 |     Constructor for BaseAutoTreeCV.
48 |
49 |     Args:
50 |         metric: Loss metric to use as base for estimation process.
51 |         cv: Splitter object to use when estimating the model.
52 |         n_trials: Number of optimization trials to use when finding a model.
53 |         timeout: Timeout in seconds to stop the optimization.
54 |     """
55 |     self.metric = metric
56 |     self.cv = cv
57 |     self.n_trials = n_trials
58 |     self.timeout = timeout
```

meth explain

```
explain(X, **explainer_params)
```

Explains the inputs.

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```
60 | def explain(self, X: Inputs, **explainer_params):
61 |     """
62 |     Explains the inputs.
63 |     """
64 |     raise NotImplementedError()
```

meth optimize

```
optimize(estimator_type, X, y, parameters, return_train_score, **kwargs)
```

Fits a model using Bayesian optimization and optuna.

Parameters:

Name	Type	Description	Default
<code>estimator_type</code>		type of object to use when fitting models.	<i>required</i>
<code>X</code>	<code>Inputs</code>	Input data to use when fitting models.	<i>required</i>
<code>y</code>	<code>GroundTruth</code>	Ground truth data to use when fitting models.	<i>required</i>
<code>return_train_score</code>	<code>bool</code>	Whether to return or not the training score for optimization.	<i>required</i>
<code>parameters</code>	<code>OptimizerParams</code>	Distributions defined by user to select trial values.	<i>required</i>

Returns:

Type	Description
	Fitted <code>estimator_type</code> object, using the best parameters selected using Bayesian optimization.

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```
def optimize(
    self,
    estimator_type,
    X: Inputs,
    y: GroundTruth,
    parameters: OptimizerParams,
    return_train_score: bool,
    **kwargs,
):
    """
    Fits a model using Bayesian optimization and optuna.

    Args:
        estimator_type: type of object to use when fitting models.
        X: Input data to use when fitting models.
        y: Ground truth data to use when fitting models.
        return_train_score: Whether to return or not the training score for
            optimization.
        parameters: Distributions defined by user to select trial values.

    Returns:
        Fitted `estimator_type` object, using the best parameters selected using
        Bayesian optimization.
    """

    def _objective(trial: Trial) -> float:
        """Objective function to use in optimization."""
        estimator = estimator_type(
            **kwargs,
            **parameters.get_trial_values(trial),
        )

        cv_results = cross_validate(
            estimator,
            X,
            y,
            scoring=self.scorer,
            cv=self.cv,
            return_train_score=return_train_score,
        )
        trial.set_user_attr("cv_results", cv_results)
        return np.mean(cv_results["test_score"])

    self.study_ = create_study(
        direction="maximize",
        sampler=TPESampler(),
        pruner=HyperbandPruner(),
    )
    self.study_.optimize(_objective, n_trials=self.n_trials,
        timeout=self.timeout)
    self.best_params_ = self.study_.best_params

    return estimator_type(**self.best_params_, **kwargs).fit(X, y)
```

meth **predict** abstractmethod

```
predict(X)
```

Abstract implementation for a prediction function.

” Source code in `src/tree_machine/base.py`

```
66 | @abstractmethod
67 | def predict(self, X: Inputs) -> Predictions:
68 |     """
69 |     Abstract implementation for a prediction function.
70 |     """
71 |     raise NotImplementedError()
```

meth **predict_proba** abstractmethod

```
predict_proba(X)
```

Abstract implementation for a prediction function, returning probabilities.

” Source code in `src/tree_machine/base.py`

```
73 | @abstractmethod
74 | def predict_proba(self, X: Inputs) -> Predictions:
75 |     """
76 |     Abstract implementation for a prediction function, returning
77 |     probabilities.
78 |     """
    raise NotImplementedError()
```