classifier_cv.py

Summary

This code defines a `ClassifierCV` class for automated classification using XGBoost with Bayesian optimization and SHAP explanations.

Dependencies

Standard Library

- typing

Other

- numpy
- pandas
- pydantic
- shap
- sklearn
- xgboost

Description

The `classifier_cv.py` file implements an automated classification system using XGBoost as the base classifier. The main class, `ClassifierCV`, inherits from `BaseAutoCV`, `ClassifierMixin`, and `ExplainerMixIn`, combining functionality for automated model training, classification, and model explanation.

The system uses Bayesian optimization to find the best hyperparameters for the XGBoost classifier. It allows for configuration of monotonicity constraints and interaction constraints on features, which can be useful for enforcing domain knowledge or logical relationships in the data.

The `ClassifierCV` class provides methods for fitting the model, making predictions, and explaining the model's decisions using SHAP (SHapley Additive exPlanations) values. It also includes functionality for cross-validation and custom metric optimization.

The code is designed to be flexible and customizable, allowing users to specify their own classification metrics, cross-validation strategies, and optimization parameters. It also includes type hints and validation using Pydantic, which enhances code reliability and provides clear interface definitions.

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