Towards Efficient and Explainable Automated Machine Learning Pipelines Design

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Context
- Automated selection & parametrization of machine learning algorithms.
- Guided Hyperparameters optimization.
- Optimal performance of ML models for a given classification task.
- Explainability of the recommended models.
- Application to the Industry 4.0.
- Empirical study on manufacturing data for validation and usability purposes.

Key concepts
Automated Machine Learning (AutoML) Auto ML is often used to help domain experts, who typically have limited ML expertise, in order to generate and build high quality models to better meet their specific business needs.

Meta-learning refers to the algorithms that are concerned with their own learning process as well as learning across a series of related prediction tasks.

Explainable AutoML (XAutoML) provide a set of tools and frameworks to better understand and interpret the predictions of a machine-learning model.

Proposed assistance system

ML pipelines recommendation (AMLBid)

AutoML Input

AutoML Output (2)

AutoML EXPLAINER

Properties
(1) Search space exploration
(2) Ranked recommendations

Dataset

XAI Input

Explanations generation

XAI Output

AML Bid package

AML Bid is a self-explainable AutoML system in the form of a Python-package. The system proposes a transparent and justified analysis to discover the most suitable model for optimal performance among multiple ML models. It attempts to automate the process of the algorithms selection, the tuning of hyperparameters, and traceability in supervised ML.

Recommender module

Explainer module

Reporting & Trust building

Tasks
- Recommendation Properties
- Model sum. & Classification stats.
- Features Importance & Dependence
- What-if analysis & Interaction effects
- Decision path
- Refinement recommendation
- Guided bayesian optimization

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Results
- Click or Scan the QR Code to explore all results and publications

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