Microsoft Research

ALICE
Automated Learning and Intelligence
for Causation and Economics

EconML: A Machine Learning Library for Estimating Heterogeneous Treatment Effects

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github.com/Microsoft/EconML

Why EconML?

- Applies the power of **machine learning** to estimate individualized causal responses from observational data

- Incorporates **techniques form recent academic works** (e.g. Double Machine Learning, Causal Forests, Deep Instrumental Variables, Meta-learners, etc.) under a common API

- Empowers researchers/data scientists/decision-makers to perform **causal analysis without extensive Economics training**
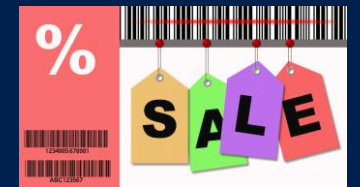
Heterogeneous treatment effect applications (top to bottom): **targeted advertising, dynamic pricing, clinical trials.**

EconML Features

- Wide range of estimators for different estimation scenarios

- Built-in cross-validation

- Inference (i.e. confidence intervals)

- Interpretability tools

- Built on standard machine learning packages

- Open source

EconML is Really Easy to Apply!


```python
from econml.dml import LinearDMLCateEstimator

cate_est = LinearDMLCateEstimator(
                model_y = RandomForestRegressor(),
                model_t = RandomForestRegressor(),
                featurizer = PolynomialFeatures(degree=3)
                )
# Fit estimator with inference and calculate treatment effects
cate_est.fit(Y, T, X, W, inference= 'statsmodels' )
te_pred = cate_est.effect(X_test)
# Get confidence intervals
lower, upper = cate_est.effect_interval(X_test, alpha=0.05)
```
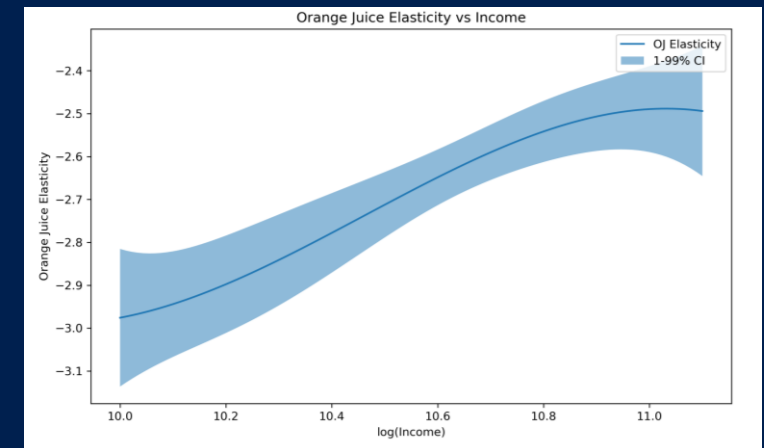
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Try It Out!

- Python: pip install econml

- GitHub: github.com/microsoft/EconML

- Documentation: econml.azurewebsites.net

- Jupyter Notebooks: github.com/microsoft/EconML/tree/master/notebooks