THE Winter School 2019 in «Machine Learning»

Lecturer: Anthony Strittmatter, www.anthonystrittmatter.com

Prerequisites: Basic knowledge in statistics or econometrics is required (keywords: OLS, MSE, propensity score matching). Programming skills (in R) are not required but some basic skills are certainly helpful.

Schedule:

Thursday, December 12

- 9:15-10:45: Promises and Perils of Machine Learning
- 11:00-12:30: Predictive Machine Learning

Friday, December 13

- 9:00-10:30: Causal Machine Learning

Course Description:

The purpose of the course is to give participants a short overview about how they can deploy machine learning methods in their own research projects.

The first lecture gives an overview about the scope of machine learning applications in business and economic research including example applications. We discuss which research tasks can be pegged to machine learning algorithms and which tasks have to remain under human control. We discuss the difference between predictive and causal machine learning. The course participants learn the perils of machine learning.

The second lecture focuses on predictive machine learning. We introduce regularized regression methods (Lasso, Ridge, Elastic Net). We discuss the importance of sample splitting to avoid overfitting. We apply Lasso algorithms to predict used car prices in a practical PC session. Web-scraped market data from an used car online advertisement platform is provided.

The third lecture covers the double machine learning approach. This is a method that uses machine learning to account for high-dimensional confounders. It is an alternative to the multivariate OLS or matching estimators, which are widely used for policy evaluations under conditional independence assumptions. We apply the double machine learning approach to estimate causal effects of participation in a job training program on earnings (using Lasso methods).