Machine Learning for Economists

Dates: August 10-12, 2022

Instructor: Achim Ahrens, PhD
                  Post-Doc and Senior Data Scientist
                  Public Policy Group & Immigration Policy Lab
                  ETH Zürich

Host: University of St Andrews
                  School of Economics and Finance, Castlecliffe, The Scores, St. Andrews
                  The lectures and computer labs will take place in lecture rooms and computer
                  labs of the University. On the first day participants should go to the lobby area of
                  the School of Economics and Finance to collect their badges and any printed
                  materials between 8:30 am and 8:50 am.

Objectives

The Summer School aims to provide a structured and up-to-date introduction to Machine Learning for economists and other social scientists. The aim of the workshop is to convey an understanding of fundamental concepts, but also to equip students with the necessary skills to apply methods from the ML toolbox.

Part 1 of the workshop introduces fundamental principles and algorithms for prediction and classification tasks. We will primarily discuss supervised learning; unsupervised methods will be covered only in passing. The focus will be on regularized regression (e.g., Lasso, Ridge) and ensemble methods (random forests, boosting, stacking).

Part 2 dives into the rapidly increasing literature on causal inference using machine learning. We try to answer the question how ideas from ML can facilitate causal inference. To this end, we discuss Causal Forests and Double ML. We also devote one session to policy learning where the aim is to derive optimal treatment rules.

While the workshop will be held in R, a final session demonstrates some of the methods in Stata.

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Audience

This Summer School is intended primarily for PhD students conducting research in economics and in other disciplines within the Social Sciences. Priority in terms of admission will be given to students who are in their 2nd year of studies and beyond. If spaces are available, members of staff and PhD graduates will also be offered a place.

Assumed Prior Knowledge

Participants are expected to have good knowledge of statistics or econometrics (demonstrated as successful completion of at least one post-graduate level course on the topic) and basic understanding of computer programming practises.

Prior exposure to the R system for statistical analysis is necessary, at the level presented, for example, in the official tutorial:

https://cran.r-project.org/doc/manuals/r-release/R-intro.html

Schedule

Date	Morning Session	Afternoon Session	Extra Activities
Wednesday, August 10	9.00-12.00 Introduction to Machine Learning	13.30-16.30 Regularized regression: Lasso, Ridge and Elastic Net	8.50-9.00 Welcome by the SGPE Co-Directors
Thursday, August 11	9.00-12.00 Ensembles: Random forests, Boosting and Stacking	13.30-16.30 Causal ML: Double-ML and Causal Forests	
Friday, August 12	9.00-12.00 Policy learning: Who should *receive* which treatment?	13.30-16.30 ML with Stata: pdslasso, ddml and pystacked	18.00-20.00 Farewell Dinner

Each session consists of approximately 90 minutes lecture and 60 minutes tutorial, plus breaks.

Reading Material

Reading material will be distributed by email to the participants in the week prior to the summer school.

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Fees and Registration

	Course Fee*	Application Portal Opens	Application Portal Closes
PhD students from within Scotland	£150	2-June-2022	17-June-2022
Members of staff affiliated with a SGPE member HEI	£300	2-June-2022	17-June-2022
External Participants	£400	18-June-2022	30-June-2022

*The course fee covers, apart from the costs directly associated with the Summer School, refreshments provided during the morning and afternoon breaks and a farewell dinner on the 12ᵗʰ of August.

For further information and to apply, please go to:
SGPE PhD Summer School - Machine Learning for Economists | The University of Edinburgh

Admission decisions will be communicated within a week of the respective application deadline and registration is to be completed within a week of admission notification, as otherwise the admission decision will be rescinded. A non-refundable fee of £75 must be paid at the time of registration.

Please direct any queries to the SGPE Office: sgpe@ed.ac.uk and to Dr. Achim Ahrens, achim.ahrens@gess.ethz.ch

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