Causal Machine Learning

ECTS : 3

Description du contenu de l'enseignement :

1) Review of identification strategies in observational studies using directed acyclic graphs (DAGs).

2) Overview of machine learning (ML) methods for prediction

3) Double selection and Double ML to estimate average treatment effects

4) Heterogeneous Treatment Effects

5) Policy learning

6) Synthetic Counterfactuals

7) Staggered Difference-in-Differences with heterogeneous effects

Compétence à acquérir :

This module aims to provide a general understanding of when and how machine learning (ML) methods can be helpful for causal analysis. The course starts with a short review of the most common identification strategies using causal diagrams, particularly directed acyclic graphs (DAGs), and an explanation of why ML methods for prediction cannot be directly used off the shelf for valid statistical inference. The core of the course will be devoted to summarising from an applied economist point of view part of the new and rapidly growing econometric literature that adapts ML methods for causal inference questions, highlighting the relevance and additional gains that these methods could bring relative to the standard econometric approaches. The emphasis is on applying the methods rather than just the technical details about them. The focus is on both the average treatment effects and heterogeneous treatment effects.

Mode de contrôle des connaissances :

The evaluation will consist of a research project/short essay using the methodologies presented in class on an agreed-upon topic with the instructor.

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Université Paris Dauphine - PSL - Place du Maréchal de Lattre de Tassigny - 75775 PARIS Cedex 16