Causal Machine Learning

ECTS : 3

Enseignant responsable : Francesco SERTI

Langue du cours : Français

Volume horaire : 21

Description du contenu de l'enseignement :

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

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

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

4) Methods to estimate Heterogeneous Treatment Effects

5) Synthetic Counterfactuals

6) Imputation methods for staggered Difference-in-Differences

References to papers and books will be given in class.

Compétences 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 core of the course will be devoted to summarizing, 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.

Pré-requis recommandés

While prior experience with machine learning for prediction and econometric methods is recommended, the first two units comprehensively review fundamental concepts, ensuring all participants can master the topics covered in later units.

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.

Bibliographie, lectures recommandées :

References to papers and books will be given in class.