

Deep Learning-based Parameter Inference for Social and Economic Models

Abstract

In this seminar, Thomas Gaskin will present a neural network-based computational framework to learn system models from data. Unknown components of a mathematical model are replaced with a neural network, which is trained by requiring its output to reproduce the observation data via the model. The framework supports both parametric and non-parametric estimation, and has been shown to outperform classical estimation techniques such as regression or Monte-Carlo sampling, while naturally allowing for uncertainty quantification. He will present a series of case studies from economics and the social sciences using real-world data: specifically, an analysis of global trade of food and agricultural products using optimal transport. Replacing the unknown components with a neural network leads to a significant improvement over traditional gravity models and allows uncovering the hidden patterns of trade barriers. He will also introduce his ongoing research results on estimating annual bilateral migration flows.