SEMINAR

From agent-based simulations to machine learning: The experience of the Applied Research Team in computational economics

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Artificial intelligence, and computation more generally, are rapidly becoming ubiquitous within every scientific discipline, and in everyday life. The Applied Research Team (ART) of the Bank of Italy (https://www.bankit.art/) is a computer-science oriented research unit with the mission of identifying and harnessing the potential benefits of this rapid technological expansion for the institution's objectives and operations. In my presentation, I will highlight some recent contributions of ART in computational economics. I will begin by overviewing research dedicated to constructing large-scale "agent-based" simulation models, and to calibrating such models with real data. In doing so, I will also illustrate Black-it, a calibration software recently released in open-source by Bank of Italy [Benedetti et al., JOSS, 2022] (https://github.com/bancaditalia/black-it). Then, I will showcase two uses of machine learning techniques to enhance economic analysis: the application of reinforcement learning to analyse and extend agent-based simulations [Glielmo et al., ICAIF, 2023], and the application of a newly designed tool called the "Information Imbalance" [Glielmo et al., PNAS Nexus, 2023] for detecting hidden relationships between time series variables.