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MACHINE LEARNING SIMULATES AGENT-BASED MODEL TOWARDS POLICY-MAKING

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EXTENDED ABSTRACT

This presentation focuses on an empirically-based spatial-economic existing agent-based model (ABM) (Furtado 2021), specifically in a 244-unique combination of eight parameter-based rules and 37 actual parameters that are associated to 5,594 individual-run results as the basis for a discussion on the vision of Inverse Generative Social Sciences. We argue that even (a) if we were able to sufficiently describe an initial and target point for a given phenomena, (b) if we knew what the trajectory was and (c) if we could guarantee that a slightly different (previous) starting point would not lead to a different pathway and target, there exists a dense space of policy alternative interventions that lead to a bundle of solutions that are consistently and relatively more socially beneficial when compared to baseline scenarios. We aim to show that although a full description and understanding of society may be fuzzy, a superior dominant dense policy space may be identifiable, thus leading to the design of sound policy normative framework. Such line of reasoning leads to outputs that identify possible causal mechanisms that perform comparatively better despite the imperfections and incompleteness of both description and trajectories. The procedure is intended to be as follows: we will train machine learning models with a variety of methodological alternatives, but especially neural networks and genetic algorithm, that map our initial configuration of parameters and rules towards the obtained results. Once a mapping is completed, that is, once the structure of the literature-driven ABM has been codified and learned, we can amplify the space of reason of initial parameters and rules to its full extent (thus much larger than the original 244 tried configurations) and associate each new configuration to results. Among those results we can filter out the ones that construe a space of mostly social benefit – with higher output and less inequality being a prime. These selected top results will point to relevant configuration of rules (policies), thus in practice constituting itself in a dominant space of policy effective results despite the lacking of full knowledge on description and fitness to past, eventually random, trajectories.

REFERENCES

Furtado, B. A. 2021. “PolicySpace2: modeling markets and endogenous housing policies”. Submitted. Preprint available on https://arxiv.org/abs/2102.11929.

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