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Host: Timo Dimitriadis

Automating Assessment of Machine Learning Research:
Revisiting Arrow's Impossibility Theorem

Abstract:
Research findings are increasingly shared as computational pipelines, replete with information allowing re-executability and verification of results. I present a value proposition for model checking in machine learning, and argue for an automated approach. I present new empirical results from our open source automated machine learning model checking tool, Reproscreener, which checks a set of benchmark criteria at the point of publication with the goal of providing guarantees on correctness, scalability, and transparency. A 2019 National Academies of Science, Engineering, and Medicine report defined reproducibility as "obtaining consistent computational results using the same input data, computational steps, methods, code, and conditions of analysis." As model checking efforts yield results, we show that the meaning of consistency in this definition gives rise to a novel application of Arrow's Impossibility Theorem (1951, Nobel Prize in Economics 1972) in automated model checking.