

# Abstract: MachSMT: A Machine Learning-based Algorithm Selector for SMT Solvers

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## Abstract

In this paper, we present MachSMT, an algorithm selection tool for state-of-the-art Satisfiability Modulo Theories (SMT) solvers. MachSMT supports the entirety of the logics within the SMT-LIB initiative. MachSMT uses machine learning to learn empirical hardness models (a mapping from SMT-LIB instances to solvers) for state-of-the-art SMT solvers to compute a ranking of which solver is most likely to solve a particular instance the fastest. We analyzed the performance of MachSMT on 102 logics/tracks of SMT-COMP 2019 and observe that it improves on competition winners in 49 logics (with up to 240% in performance for certain logics). MachSMT is clearly not a replacement for any particular SMT solver, but rather a tool that enables users to leverage the collective strength of the diverse set of algorithms implemented as part of these sophisticated solvers. Our MachSMT artifact is available at <https://github.com/j29scott/MachSMT>.