

# Automatically Characterizing Software for Algorithm Selection

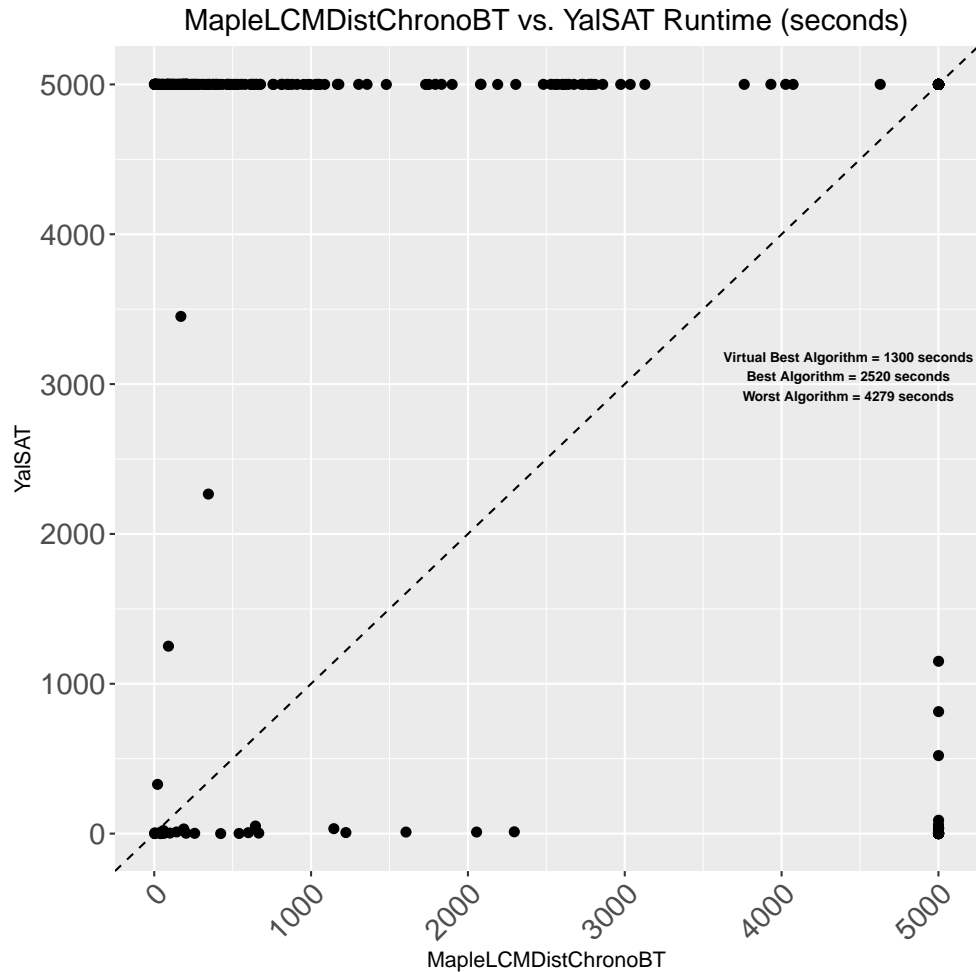
Damir Pulatov and Lars Kotthoff

University of Wyoming

# Introduction

- Many difficult problems have multiple algorithms that solve them. Performance of these algorithms can be complementary.
- Intuitive approach – select the best overall algorithm.
- Clever approach – take advantage of each algorithm to build better performing system.
- Why bother? – difference between solving a problem within a fraction of a second vs. hours.

# Empirical Motivation



# Proposal

- Algorithm Selection – automatically select the optimal algorithm for a given task.
- Standard implementation – one performance model per algorithm, algorithms are black boxes. Usually works well, but fails in some cases.
- Proposed approach – one performance model with algorithmic features, algorithms are white boxes.
- Intuition – exposing useful algorithm information and allowing selector to distinguish between algorithms should improve results.
- Goal – leverage information from algorithms to improve algorithm selection systems especially in cases when it fails.

# Flowchart

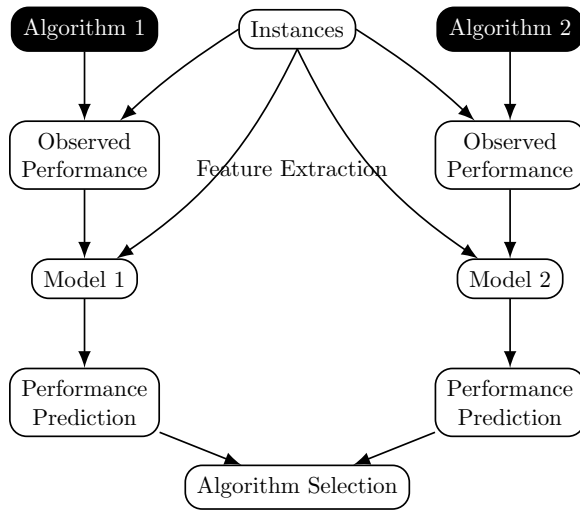


Figure 1: Standard black box approach

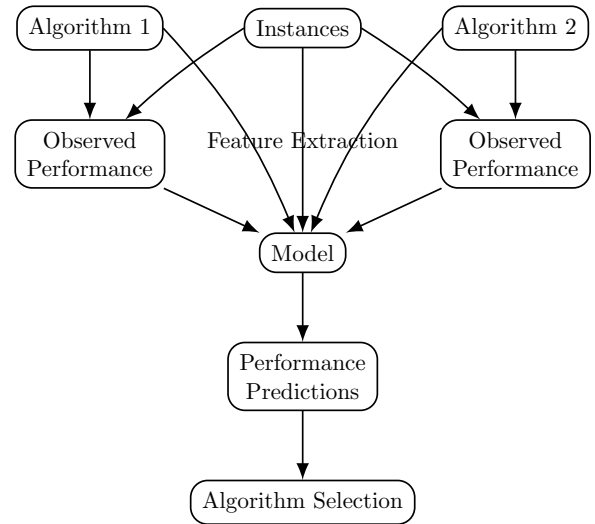


Figure 2: Proposed white box Approach