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Learning to Build Covering Arrays with Hyperheuristic Search

Today there are a large number of techniques and tools to build covering arrays. Some of the algorithms are optimized for constrained or unconstrained variants of the problem, or work best on specific symbol sizes or strengths. Yet, no one strategy fits all. In this work we introduce a hyperheuristic algorithm that learns strategies for building covering arrays providing a single generalist approach. Our experiments show that our algorithm competes with known best search algorithms across 85 constrained and unconstrained problems from the software testing domain. For most of the models, hyperheuristic search is as good as, or improves upon the best known search results. We also present some evidence that our algorithm's strong generic performance is the result of unsupervised learning.