Portfolio approaches in constraint programming
Invited Talk

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Abstract. Recent research has shown that the performance of a single, arbitrarily efficient algorithm can be significantly outperformed by using a portfolio of —possibly on-average slower— algorithms. Within the Constraint Programming (CP) context, a portfolio solver can be seen as a particular constraint solver that exploits the synergy between the constituent solvers of its portfolio for predicting which is (or which are) the best solver(s) to run for solving a new, unseen instance.

In the work we examined the benefits of portfolio solvers in CP. We focused in particular on sequential approaches, i.e., portfolio solvers always running on a single core. We started from a first empirical evaluation on portfolio approaches for solving Constraint Satisfaction Problems (CSPs), and then we improved on it by introducing new data, solvers, features, algorithms, and tools. Afterwards, we addressed the more general Constraint Optimization Problems (COPs) by implementing and testing a number of models for dealing with COP portfolio solvers. Finally, we have come full circle by developing sunny-cp: a sequential CP portfolio solver that turned out to be competitive also in the MiniZinc Challenge, the reference competition for CP solvers.