

Dynamic selection of enumeration strategies for solving constraint satisfaction problems

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The main goal concerning Constraint Satisfaction Problems is to determine a value assignment for variables satisfying a set of constraints, or otherwise, to conclude that such an assignment does not exist (the set of constraints is unsatisfiable). In the Constraint Programming resolution process, it is known that the order in which the variables are assigned have a significant impact in terms of computational cost. In this paper we propose a new framework for guiding the classical Constraint Programming resolution process. Such a framework is able to measure the resolution process, using some indicators, in order to perform on-the-fly replacements of variable/value ordering heuristics exhibiting poor performances. The replacement is performed depending on a quality rank, which is computed by means of a choice function-based Hyperheuristic, where its parameters are fine-tuned by a Genetic Algorithm which trains the choice function carrying out a sampling phase. The experimental results show the effectiveness of our approach where our combination of strategies outperforms the use of individual strategies.