

Choice functions for autonomous search in constraint programming: GA vs. PSO [Funkcije izbora za samostalno pretraživanje u ograničenom programiranju: Genetski algoritam nasuprot optimizaciji roja čestica]

Soto R.

Crawford B.

Misra S.

Palma W.

Monfroy E.

Castro C.

Paredes F.

The variable and value ordering heuristics are a key element in Constraint Programming. Known together as the enumeration strategy they may have important consequences on the solving process. However, a suitable selection of heuristics is quite hard as their behaviour is complicated to predict. Autonomous search has been recently proposed to handle this concern. The idea is to dynamically replace strategies that exhibit poor performances by more promising ones during the solving process. This replacement is carried out by a choice function, which evaluates a given strategy in a given amount of time via quality indicators. An important phase of this process is performed by an optimizer, which aims at finely tuning the choice function in order to guarantee a precise evaluation of strategies. In this paper we evaluate the performance of two powerful choice functions: the first one supported by a genetic algorithm and the second one by a particle swarm optimizer. We present interesting results and we demonstrate the feasibility of using those optimization techniques for Autonomous Search in a Constraint Programming context.

Artificial intelligence

Autonomous search

Constraint Programming

A-particles

Autonomous searches

Choice function

Constraint programming

Key elements

Optimization techniques

Poor performance

Quality indicators

Artificial intelligence

Computer programming

Constraint theory

Function evaluation

Particle swarm optimization (PSO)

Quality control