YAHSP3 and YAHSP3-MT in the 8th International Planning Competition

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Description

YAHSP3 (Vidal 2004) is a forward state-space heuristic search planner that embeds a lookahead policy based on an analysis of relaxed plans. The core of the solver has nearly not evolved since IPC-2011 where YAHSP2 competed, and is described in full details in (Vidal 2011). It can be noted that a minor bug with major effects has been fixed, which prevented YAHSP2 to find valid plans in domains with O-cost actions (YAHSP2 got a score of 0 in all such domains at IPC-2011). The multi-threaded version YAHSP3-MT is also nearly identical to YAHSP2-MT, and is described in (Vidal, Bordeaux, and Hamadi 2010).

YAHSP{2,3} have been used in different projects:

- **Parallel planning on distributed memory machines.** YAHSP has been parallelized following the ideas of HDA* (Kishimoto, Fukunaga, and Botea 2009) with the MPI library and evaluated on two kinds of machines with a distributed memory architecture: a small-sized cluster consisting of 4 servers with 12 cores each, and an experimental many-core processor developed by Intel Labs, the Single-chip Cloud Computer (SCC), containing 48 cores on a mesh. Super-linear speedups are often observed, particularly on the SCC thanks to the efficiency of its internal network (Vidal, Vernhes, and Infantes 2011).
- **The Landmark-based Meta Best-First Search algorithm (LMBFS).** The objective was to perform a meta-search in the space of landmark orderings, in order to find a sequence of landmarks that could help an underlying planner to find a solution (Vernhes, Infantes, and Vidal 2012; 2013b). A parallelization of the meta-search algorithm inspired by (Vidal, Vernhes, and Infantes 2011) has been proposed in (Vernhes, Infantes, and Vidal 2013a), but has not produced interesting results yet.
- **Multi-objective AI planning.** The DaE planner (Schoenauer, Savéant, and Vidal 2006; 2008; Bibaï et al. 2010) that embeds YAHSP has been extended with multi-objective evolutionary algorithms (NSGA-II, SPEA2, IBEA_{H}) in order to generate Pareto fronts, and studied following different perspectives (Khouadjia et al. 2013b; 2013d; 2013a; 2013c). Experimental results have been produced on modified benchmarks from the IPC for supporting several objectives.

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