

International Planning Competition 2008 – Deterministic Part

Participating Planners

Sequential satisficing track

C³ M. Ramírez, N. Lipovetzky, H. Geffner ▶ two-tiered forward state space search ▶ 1st tier: incomplete backtracking ▶ 2nd tier: WA* using cost-sensitive h_{add} ▶ novelty in 1st tier: powerful structural pruning scheme based on inference along possible causal chains	Divide-and-Evolve 1/2 J. Bibai, P. Savéant, M. Schoenauer, V. Vidal ▶ decomposes problem into ordered subgoal collection ▶ candidate subgoal sequences generated by evolutionary algorithm ▶ subproblems solved consecutively and compressed into global solution using CPT	DTGPlan R. Huang, Y. Chen, W. Zhang ▶ novel anytime algorithm ▶ A* search in hierarchically extended abstract search space ▶ retrieves sub-plans directly and greedily from DTGs via causal analysis ▶ multiple heuristics to further boost search beyond the abstract space
FF(h_a) E. Keyder, H. Geffner ▶ forward state space search with delete relaxation heuristic, a la HSP and FF ▶ extracts relaxed plan using <i>best supports</i> for each atom encoded by h_a ▶ FF's framework: EHC, helpful actions	FF(h_{sa}) E. Keyder, H. Geffner ▶ forward state space search with delete relaxation heuristic, a la HSP and FF ▶ h_{add} modified to propagate <i>sets of actions</i> representing relaxed plans ▶ better relaxed plans than h_a, but costlier to compute ▶ FF's framework: EHC, helpful actions	LAMA S. Richter, M. Westphal ▶ heuristic forward state space search ▶ combines popular FF heuristic and novel <i>landmark heuristic</i> ▶ based on Helmert's Fast Downward ▶ action costs incorporated into heuristic ▶ cost-sensitive search algorithm: iterated WA*
Plan-A Q. Lv, Y. Chen, R. Huang ▶ SAT-based planner optimizing action costs instead of makespan! ▶ uses DPLL-opt, a SAT-constrained optimization solver ▶ branch-and-bound pruning strategy ▶ continues after first feasible layer	SGPlan 6 C.-W. Hsu, B. Wah ▶ partitions planning problem into subproblems by parallel decomposition ▶ identifies partitioning attributes, multi-valued formulation to exploit localities ▶ modified Metric-FF for subproblems ▶ resolves inconsistencies using the Extended Saddle Point Condition	Baseline planner ▶ throws away action costs ▶ runs Hoffmann's FF

Temporal satisficing track

CPT3 V. Vidal ▶ <i>optimal temporal planner</i> based on POCL and constraint programming ▶ <i>makespan</i> optimization via <i>branch and bound</i>	Divide-and-Evolve 1/2 J. Bibai, P. Savéant, M. Schoenauer, V. Vidal ▶ decomposes problem into ordered subgoal collection ▶ candidate subgoal sequences generated by evolutionary algorithm ▶ subproblems solved consecutively and compressed into global solution using CPT	SGPlan 6 C.-W. Hsu, B. Wah ▶ basic search strategy as in sequential satisficing track ▶ post-processing to annotate sequential plans with time information
Temporal Fast Downward G. Röger, P. Eyerich, R. Mattmüller ▶ temporal and numeric extension of Helmert and Richter's Fast Downward ▶ forward search in space of time-stamped states ▶ uses an extended version of the context-enhanced additive heuristic of Helmert and Geffner	TLP-GP F. Maris, P. Régnier ▶ temporally expressive planner ▶ backwards search in planning graph extended with temporal labels ▶ performs planning and scheduling at the same time ▶ uses MathSat solver to verify DTP ▶ provides a floating solution plan	Baseline planner ▶ removes temporal problem aspects ▶ runs Hoffmann's Metric-FF ▶ schedules the sequential plan with a simple critical path algorithm

Sequential optimization track

CFDP S. Grandcolas, C. Pain-Barre ▶ based on <i>FDP search procedure</i> (IDDFS strategy) ▶ memorizes subproblem plans + costs ▶ starts with plan optimal in the number of actions, then increases length ▶ stops when it proves that longer plans are more costly	CO-Plan N. Robinson, C. Gretton, D. N. Pham ▶ two-phase cost-optimal planner ▶ phase I: SAT-based planner with modified RSat backend to find a minimal-cost step-optimal plan ▶ phase II: forward search in state space to find cost-optimal plan, bounded by the cost of plan identified in phase I	CPT3 V. Vidal ▶ <i>optimal temporal planner</i> based on POCL and constraint programming ▶ <i>makespan</i> optimization via <i>branch and bound</i> ▶ for optimal sequential planning, force total ordering of actions and model action costs as durations
Gamer S. Edelkamp, P. Kissmann ▶ <i>bidirectional symbolic BFS</i> and <i>symbolic A*</i> in the state space ▶ heuristic: <i>symbolic perimeter search</i> ▶ complete search algorithm based on <i>symbolic cost matrix</i> ▶ <i>multi-actions</i> for conditional effects ▶ generates SAS⁺ encoding	HSP₀* P. Haslum ▶ heuristic state space search (A*) ▶ heuristic: variant of additive h^2 ▶ uses <i>regression</i> search	HSP_F* P. Haslum ▶ heuristic state space search (A*) ▶ heuristic: variant of additive h^2 ▶ uses <i>forward</i> search
Mips-XXL S. Edelkamp, S. Jabbar ▶ <i>external breadth-first branch and bound search</i> in the state space ▶ pruning technique on sequential total cost to terminate search with intermediate results recorded on disk ▶ delayed duplicate detection based on external sorting	Upwards A. Coles, A. Smith ▶ performs <i>regression search</i> within a SAS⁺ state space ▶ <i>depth-first branch & bound</i>, with 30 seconds of LPG to find an upper bound ▶ <i>mobile analysis</i>: abstract route planning ▶ <i>tunnel macros, variable symmetries</i>: further reduce explored search space	Baseline planner ▶ brute-force uniform cost search (A* with $h = 0$) ▶ uses LAMA's search code

Net benefit optimization track

Gamer S. Edelkamp, P. Kissmann ▶ <i>symbolic cost-first branch and bound search</i> with fixpoints on 0-cost actions ▶ several novel pruning techniques to terminate search with intermediate results recorded on disk ▶ preferences represented as BDDs ▶ generates SAS⁺ encoding	HSP_P* P. Haslum ▶ trivial reduction to min cost planning: enumerate goal sets, find optimal plan for each (using regression, IDA* & a variant of additive h^2) ▶ only improvement: switch between goal sets to always work on "most promising" goal set $\rightsquigarrow$ first plan optimal	Mips-XXL S. Edelkamp, S. Jabbar ▶ <i>external breadth-first branch and bound search</i> in the state space ▶ pruning technique on sequential total cost to terminate search with intermediate results recorded on disk ▶ delayed duplicate detection based on external sorting
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Planners that did not participate

▶ sequential satisficing track:	23 registered,	9 submitted
▶ sequential optimization track:	19 registered,	8 submitted
▶ temporal satisficing track:	12 registered,	6 submitted
▶ temporal optimization track:	4 registered,	1 submitted
▶ net benefit satisficing track:	11 registered,	1 submitted
▶ net benefit optimization track:	6 registered,	3 submitted