Dynamic Control in Path-Planning with Real-Time Heuristic Search







Problem Formulation

- Heuristic search for planning ✦ ASP, HSP, FF, SHERPA, LDFS
- ✦ Real-time heuristic search
 - Constant time per move
- Real-time path-planning
 - ✤ I-3 ms for all units in games





- Learning Real-time A* (LRTA*)
 - Constant look-a-head depth
 - + Heuristic w.r.t. a fixed goal





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Dynamic LRTA*

- Dynamic selection at each step:
 - Look-a-head depth and sub-goal
- Pattern-database approach
 - Pre-compute for each state: intractable
 - Pre-compute for each abstract state
 - + optimal action? No
 - + depth and next goal? Yes



- Decision-tree approach
 - Use local search-space attributes to predict best look-a-head depth

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Lookahead depth

- heuristic estimates
- *n*-step progress
- + error estimates

Pros of each approach

- Pattern-databases: optimal depths stored and sub-goals.
- Decision trees: use on unseen maps



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- planning (both with and without abstractions).
- Future work
 - Integrate with PR-LRTS
 - Applicability to general planning