

**Botea, A.; Enzenberger, M.; Müller, M.; Schaeffer, J.**

**Macro-FF: improving AI planning with automatically learned macro-operators.** (English)

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Summary: Despite recent progress in AI planning, many benchmarks remain challenging for current planners. In many domains, the performance of a planner can greatly be improved by discovering and exploiting information about the domain structure that is not explicitly encoded in the initial PDDL formulation. In this paper we present and compare two automated methods that learn relevant information from previous experience in a domain and use it to solve new problem instances. Our methods share a common four-step strategy. First, a domain is analyzed and structural information is extracted, then macro-operators are generated based on the previously discovered structure. A filtering and ranking procedure selects the most useful macro-operators. Finally, the selected macros are used to speed up future searches.

We have successfully used such an approach in the fourth international planning competition IPC-4. Our system, Macro-FF, extends Hoffmann's state-of-the-art planner FF 2.3 with support for two kinds of macro-operators, and with engineering enhancements. We demonstrate the effectiveness of our ideas on benchmarks from international planning competitions. Our results indicate a large reduction in search effort in those complex domains where structural information can be inferred.

**MSC:**

**68T20** Problem solving in the context of artificial intelligence (heuristics, search strategies, etc.)

**68T05** Learning and adaptive systems in artificial intelligence

Cited in **9** Documents

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