Principles of AI Planning

GKI presentations

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What I did earlier

I mostly worked in classical (deterministic) planning, with an emphasis on

- heuristics for domain-independent planning and
- theoretical results for subclasses of planning and for specific planning domains.

What I did earlier: planning algorithms

- 1999 invariant synthesis algorithm for STRIPS
- 1999 automatic translation from STRIPS to finite-domain representations
- 2000 deterministic planning system based on BDD exploration (MIPS); participated at IPC 2
- 2004 "causal graph heuristic" for planning tasks with finite-domain representation
- 2004 automatic translation from general PDDL2.2 to finite-domain representation
- 2004 deterministic planning system based on the causal graph heuristic; participated at IPC 4
- 2007 pattern selection for PDB heuristics
- 2007 merge-and-shrink abstractions

What I did earlier: planning theory

2001 complexity of planning in the IPC 1/2 domains

2002 decidability for planning with numbers

2006 complexity of planning in the IPC 3/4 domains

2006 approximation properties of the IPC 1–4 domains

2008 asymptotic heuristic accuracy of certain heuristics on certain planning domains

2008 theoretical lower-bound complexity of A* planning with almost perfect heuristics on certain planning domains

Supervision

2003 Untersuchung von Zustandsräumen in Zwei-Personen-Spielen
(Marianne Mueller, Studienarbeit)

2003 Entwicklung eines Double-Dummy Skat Solvers mit einer Anwendung für verdeckte Skatspiele
(Sebastian Kupferschmid, Diplomarbeit)

2005 Approximationsverfahren für Planungsprobleme in den Domänen Satellite, Depots und DriverLog
(Gabi Röger, Studienarbeit)

2005 Pfadplanung unter Unsicherheit
(Uwe Zeisberger, Diplomarbeit)

2005 Approximatives Planen in der Grid-Domäne
(Robert Mattmüller, Studienarbeit)

Supervision (ctd.)

2006 Approximationseigenschaften von Transportproblemen in der Handlungsplanung
(Michael Drescher, Diplomarbeit)

2006 Natürlichere Problemspezifikation in PDDL
(Benjamin Lempp, Studienarbeit)

2006 Ein generischer Reasoner für qualitative Kalküle
(Zeno Gantner, Studienarbeit)

2007 Algorithmen für teilerfüllendes Planen
(Benjamin Lempp, Diplomarbeit)

2007 Eine automatentheoretische Heuristik für klassische Planungsprobleme
(Dennis Jung, Diplomarbeit)

2007 Zielordnungen und Landmarken für SAS$^+$-Planer
(Matthias Westphal, Studienarbeit)

Supervision (ctd.)

2008 Kompakte Kodierungen monotoner boolescher Funktionen (David Goergen, Bachelor-Arbeit)

2008 Eliciting honest reputation feedback in a Markov setting (Jens Witkowski, Studienarbeit)

2009 Komplexität und Berechnung der h^+-Heuristik (Christoph Betz, Diplomarbeit)

now Problemvereinfachung für numerische Planungsprobleme (Stefan Schleipen, Diplomarbeit)

now A reputation mechanism for settings with both moral hazard and adverse selection (Jens Witkowski, Diplomarbeit)

What I do currently

Current interests:

- automatic problem simplification
- invariant synthesis for numerical planning problems
- relationship between SAT planning and heuristic planning
- theoretical relationships between relaxation heuristics, abstraction heuristics and landmarks
- search algorithms that integrate multiple heuristics
- making sense of the IPC-6 results
- understanding SGPlan

Want to get involved?

- Bachelor projects, Master projects, Studienarbeiten
- Bachelor's theses, Master's theses, diploma theses
- Hiwi jobs

Want a Hiwi job?

requirements:

- some programming experience: Python or C++
- familiarity with or willingness to get accustomed to basic open source software development processes (version control, basic shell scripting, basic Unix tools)