

Seminar: Search and Optimization

5. Schedule and Topics

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Seminar: Search and Optimization

October 4, 2012 — 5. Schedule and Topics

5.1 Seminar

- Schedule and Topics
- Next steps

5.2 Software project

- Topics

5.1 Seminar

Schedule

- [18.10] Fundamentals
- [25.10] Search Algorithms I
- [01.11] Search Algorithms II
- [08.11] Domain Studies
- [15.11] Abstraction Heuristics I
- [22.11] Abstraction Heuristics II
- [29.11] General Heuristics: Abstraction
- [06.12] General Heuristics: Delete-Relaxation
- [13.12] General Heuristics: Landmarks
- [20.12] Pruning Methods

Fundamentals

18 October 2012

- ① Ethan Burns, Matthew Hatem, Michael J. Leighton and Wheeler Ruml
[Implementing Fast Heuristic Search Code](#)
 5th Annual Symposium on Combinatorial Search (SoCS 2012), pp. 25–32, 2012
- ② Robert C. Holte
[Common Misconceptions Concerning Heuristic Search](#)
 3rd Annual Symposium on Combinatorial Search (SoCS 2010), pp.46–51, 2010

Search Algorithms I

25 October 2012

- ③ Yuima Akagi, Akihiro Kishimoto and Alex Fukunaga
[On Transposition Tables for Single-Agent Search and Planning: Summary of Results](#)
 3rd Annual Symposium on Combinatorial Search (SoCS 2010), pp. 2–9, 2010
- ④ Rong Zhou and Eric A. Hansen
[Breadth-first Heuristic Search](#)
 Artificial Intelligence, 170(4–5):385–408, 2006

Search Algorithms II

1 November 2012

- ⑤ David A. Furcy
[ITSA*: Iterative Tunneling Search with A*](#)
 AAI Workshop on Heuristic Search, Memory-Based Heuristics and Their Applications, pp. 21–26, 2006
- Hootan Nakhost and Martin Müller
[Action Elimination and Plan Neighborhood Graph Search: Two Algorithms for Plan Improvement](#)
 20th International Conference on Automated Planning and Scheduling (ICAPS 2010), pp. 121–128, 2010
- ⑥ David Furcy and Sven Koenig
[Limited Discrepancy Beam Search](#)
 19th International Joint Conference on Artificial Intelligence (IJCAI 2005), pp. 125–131, 2005

Domain Studies

8 November 2012

- ⑦ Andreas Junghanns and Jonathan Schaeffer
[Sokoban: Enhancing General Single-Agent Search Methods Using Domain Knowledge](#)
 Artificial Intelligence, 129(1–2):219–251, 2001
- ⑧ John Slaney and Sylvie Thiébaux
[Blocks World Revisited](#)
 Artificial Intelligence 125(1–2):119–153, 2001

Abstraction Heuristics I

15 November 2012

- 9 Joseph C. Culberson and Jonathan Schaeffer
[Pattern Databases](#)
 Computational Intelligence, 14(3):318–334, 1998
- 10 Ariel Felner, Richard E. Korf and Sarit Hanan
[Additive Pattern Database Heuristics](#)
 Journal of Artificial Intelligence Research, 22:279–318, 2004

Abstraction Heuristics II

22 November 2012

- 11 Fan Yang, Joseph C. Culberson, Robert Holte, Uzi Zahavi and Ariel Felner
[A General Theory of Additive State Space Abstractions](#)
 Journal of Artificial Intelligence Research, 32:631–662, 2008
- 12 Teresa M. Breyer and Richard E. Korf
[1.6-Bit Pattern Databases](#)
 24th AAAI Conference on Artificial Intelligence (AAAI 2010), pp. 39–44, 2010

General Heuristics: Abstraction

29 November 2012

- 13 Patrik Haslum, Adi Botea, Malte Helmert, Blai Bonet and Sven Koenig
[Domain-Independent Construction of Pattern Database Heuristics for Cost-Optimal Planning](#)
 22nd AAAI Conference on Artificial Intelligence (AAAI 2007), pp. 1007–1012, 2007
- 14 Patrik Haslum, Blai Bonet, and Hector Geffner
[New Admissible Heuristics for Domain-Independent Planning](#)
 20th National Conference on Artificial Intelligence (AAAI 2005), pp. 1163–1168, 2005

General Heuristics: Delete-Relaxation

6 December 2012

- 15 Blai Bonet and Héctor Geffner
[Planning as Heuristic Search](#)
 Artificial Intelligence, 129(1–2):5–33, 2001
- 16 Jörg Hoffmann and Bernhard Nebel
[The FF Planning System: Fast Plan Generation Through Heuristic Search](#)
 Journal of Artificial Intelligence Research, 14:253–302, 2001

General Heuristics: Landmarks

13 December 2012

- 17 Silvia Richter and Matthias Westphal
[The LAMA Planner: Guiding Cost-Based Anytime Planning with Landmarks](#)
 Journal of Artificial Intelligence Research, 39:127–177, 2010
- 18 Erez Karpas and Carmel Domshlak
[Cost-optimal Planning with Landmarks](#)
 21st International Joint Conference on Artificial Intelligence (IJCAI 2009), pp. 1728–1733, 2009

Pruning Methods

20 December 2012

- 19 Neil Burch and Robert Holte
[Automatic Move Pruning Revisited](#)
 5th Annual Symposium on Combinatorial Search (SoCS 2012), pp. 18–24, 2012
- 20 Raz Nissim, Udi Apsel and Ronen Brafman
[Tunneling and Decomposition-Based State Reduction for Optimal Planning](#)
 20th European Conference on Artificial Intelligence (ECAI 2012), pp. 624–629, 2012

Assignment of Topics

- ▶ We will send you the link to a doodle poll
- ▶ Number of the option = number of the topic in these slides
- ▶ Mark **at least 2** topics with **Yes**
- ▶ Mark **at least 4** topics positively: **Yes** or **(Yes)**
- ▶ until **October 7**

We will send you an email with the paper assignment and your supervisor on October 8.

Preparing the Presentation

- ▶ **Start** reading the paper and discussing it with your supervisor **well in advance**
- ▶ Have the **slides ready** at least **three days before the presentation** and send them to your supervisor for feedback
- ▶ Presentations should last **25–30 minutes** + 10 minutes discussion

Passing the Seminar

Evaluation: Pass/fail

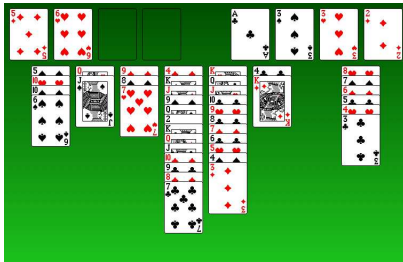
To pass...

- ▶ Give a **good presentation**
- ▶ Participate **actively** (contribute to discussion) and **regularly** (= absent at most twice)
- ▶ Have slides ready in time

5.2 Software project

Two additional topics

- ▶ Example 11: FreeCell



- ▶ Example 12: Genome rearrangement
 - ▶ Find explanation for differences between genomes of related species
 - ▶ Actions simulate mutations
 - ▶ Idea: number of required steps indicates how closely species are related

Assignment

- ▶ 2-person team per topic
- ▶ We will send you the link to a doodle poll
- ▶ Participate in poll as team (if you already have a partner) or as single person (we will assign a partner)
- ▶ Mark **at least 2** topics with **Yes**
- ▶ Mark **at least 4** topics positively: **Yes** or **(Yes)**
- ▶ until **October 14**