Seminar: Search and Optimization

5. Schedule and Topics

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October 4, 2012

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*
   AAAI 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

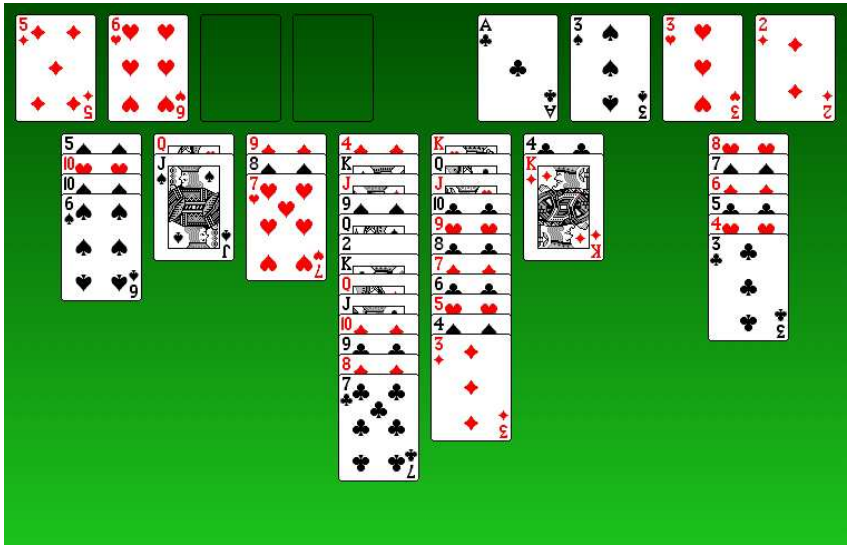
To pass. . .

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

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