Principles of AI Planning
Suggestions for Thesis and Project Topics

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What I am interested in

Planning

- **Nondeterministic planning and heuristics**
  - Strong planning, strong cyclic planning (you know that from the lecture)
  - Relaxation heuristics, abstraction heuristics (you know that from the lecture as well)
- **Temporal planning**
- **Search techniques** for planning
- Other techniques (SAT planning, BDDs, . . .)
What I am interested in

Verification

- Model checking and synthesis
  - Planning techniques
    (e.g. heuristic search in Directed Model Checking)
  - Timed Game solving
  - Abstraction refinement
- All that is relevant to the AVACS project, in particular subprojects R3 and S1 (cf. www.avacs.org)
Possible research directions
Some interesting ideas (no completely elaborated topics, though)

**Planning**
- Partial observability in nondeterministic planning
- Topics at the intersection between planning and verification
  - Symmetry reduction
  - Partial-order reduction
  - Abstraction refinement
  - ...
Possible research directions
Some interesting ideas (no completely elaborated topics, though)

Verification

- **Partial observability** in verification
- PDB techniques
  (pattern selection, families of patterns, ...)  
- Advanced search techniques for Directed Model Checking
  (pruning, parallel transitions, Monte-Carlo tree search, ...)  
- Improved abstraction refinement in Timed Game solving
Possible research directions
Some interesting ideas (no completely elaborated topics, though)

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| ■ General Game Playing  
(a thesis topic in that area would likely be co-supervised by Stefan Wölfl <woelfl@informatik.uni-freiburg.de>)  
■ Search techniques  
■ Search guidance  
■ ... |
How do we proceed?

If you are interested in a topic . . .

- . . .drop me a line:
  mattmuel@informatik.uni-freiburg.de

- or see me in my office (052-00-045).

- We will meet and agree on the scope of your thesis, project, practical, . . .

- Later: regular meetings to talk about ideas, code, literature etc.