CSC2542
Class Project

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Examples

- The next few pages contain examples of what you might need to do for various kinds of projects. These are just samples to get you started thinking …

Example 1

- Suppose you want to compare algorithm X with algorithm Y
  - E.g., compare Satplan with HPLAN-P
- Has someone already done it? (check the literature)
- Theoretical comparison?
  - Expressivity: are there domains that one algorithm can represent/solve but the other can't (or can't represent as well)?
  - Worst-case complexity: does it mean much in practice?
  - Average-case analysis: probably pretty difficult
- Experimental study?
  - How can you be sure the experiments mean anything?
    - Randomly generated problems? What about built-in bias?
    - Problems from the planning competition?
    - Statistical significance? Confounding factors?
- Overall significance of the results?
  - Does it say something general, or just about one kind of problem?

Example 2

- Suppose you want to apply AI planning to some application *X*
  - Do you know enough about *X* to do a credible job?
  - Has someone already done it? (check the literature)
  - Analyze real-world requirements
  - Formalize the problem
  - Which algorithm? What kind of algorithm?
    - Domain-independent, domain- customized, domain-specific?
  - What makes your algorithm better than others for this problem?
    - Maybe compare two algorithms? (see example 1)
  - What will you do if the algorithm doesn't work well?

Example 3

- Suppose you want to extend algorithm X to include feature Y
- E.g., modify Satplan, FastForward or some other planner
  - To include preferences, state variables, temporal reasoning, resource management, control rules, or dependency-directed backtracking
  - To produce conditional or conformant plans
  - To work in multi-agent environments (cooperative? adversarial?)
- Has someone already done it? (check the literature)
- What is the motivation for the feature? (sometimes trivial to address)
- What characteristics does your algorithm have?
  - Soundness, completeness, efficiency?
  - General idea or just a hack?
- Experimental evaluation (see example 2)
- Overall significance?
  - How general is your approach? Could it be made to work for other algorithms as well?
  - Does your approach extend to other algorithms?
  - Good for just one kind of problem, or for many? Which ones?

Further Options/Dimensions

- Literature survey
- Team project
- ….

Some things to think about…

- If you succeed in carrying out your idea, will the result be interesting?
  - Interesting to you? Interesting to others?
- What is needed to carry out your idea
  - Is it too hard to accomplish in the amount of time that you have? Is it too easy to count as a “real” project?
- How do you ensure success regardless of how the result turns out?
  - If the only interesting/significant result is “yes it works,” then you’ll be in trouble if you can’t actually get it to work. You should either
  - (1) think enough about it to be pretty sure you can get it to work, or
  - (2) reformulate it in such that any of the likely outcomes will be interesting as the main result of your project

Assessment Criteria

Your project doesn't have to necessarily make a new research contribution, though this would be nice! The primary objective is pedagogical. Nevertheless, as you train to be good researchers, it is good to evaluate whether your work is a research contribution. To that end, here are some of the questions that are often asked of reviewers assessing your work for publication (ICAPS-07 review form):

Rank (1=bad, 5=middle, 10=good)

- Reviewer familiarity *
- Relevance to the call of papers *
- Technical quality and soundness *
- Originality and novelty *
- Significance to theory and practice *
- Readability and organization *
- Overall recommendation *

Assessment Criteria (cont.)

- ORIGINALITY
- Is the work described in the paper novel?

- SIGNIFICANCE
- Is the work important?
- [Research Track] Does the work present theoretical or experimental results that advance the current state of the art in planning and scheduling?
- [Application Track] Does the work describe a high-impact application or use of planning and scheduling technologies in anoperational setting?
- [System Track] Does the paper describe a significant integration of diverse component technologies into complex planning, scheduling and execution systems?

Assessment Criteria (cont. 2)

- TECHNICAL QUALITY
- Is the work technically sound?
- Are the paper's arguments compelling?
- Is there a compelling empirical evaluation?
- [Application Track] Does the work clearly rationalize the use of planning/scheduling technologies in the target application and quantify the benefit over current practice?
- [System Track] Does the work present a successful integration of planning, scheduling, learning, constraint satisfaction or other technologies into a system that solves a well-defined problem? Does the system represent a well-engineered solution to the problem?

- QUALITY OF PRESENTATION
- Is the paper clearly written?
- Does the paper motivate the research or application?
- Is the paper well organized?

Specific Project Ideas

<we can discuss one on one>