Advanced Artificial Intelligence

CSCE 976, Spring 2002

URL: `www.cse.unl.edu/~choueiry/S02-976`

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Outline

- Pretest
- Overview and administrative trivia: look up syllabus
- Main topics
- How to write a critical summary
- What is planning?

Pretest

- Scheduled on Wednesday, Jan 14, 2002
- One part to be completed in the class
- Basic knowledge of mathematics, logic, algorithms, complexity, search, constraint satisfaction, graph concepts
- Closed books, allowed handwritten crib sheet (1 page, both sides), must be turned in with exam
- Used as an alert/warning, does not count in final grade

Web page

- Syllabus: `www.cse.unl.edu/~choueiry/S02-976`
- Schedule:
  `www.cse.unl.edu/~choueiry/S02-976/schedule.html`

Main topics

- Planning: STRIPS, POP, Conditional, Execution, GraphPlan, SATPlan/Blackbox, IPP
- Temporal reasoning: qualitative, quantitative
- Scheduling
- Spatial reasoning (briefly)
- Multi-agent Systems

Other potential topics

- Tutoring systems (review)
- Robotics (AIMA Chapter 25)
- Vision and speech recognition (AIMA Chapter 24)
- Case-Based Reasoning (Hammond - 1986)
- XML/Semantic Web

List of papers

- Check bottom of the page:
  `www.cse.unl.edu/~choueiry/S02-976/schedule.html`
- List will be continously revised
- Suggestions are welcome: contact instructor

How to write a critical summary

- We will discuss an example in class
- Generic template provided as an aid but is not mandatory
  - PART I: the paper
  - PART II: your opinion about the paper

PART I: the paper

- Context of the paper
  - problem the authors claim to address (*i.e.*, motivation)
  - assumptions they make
  - solution they claim to provide
- Short Description of proposed technique
  - basic algorithmic steps
  - optimizations, if any
  - evaluation: empirical/theoretical
- Comparison to previous techniques
  - if provided, how?
  - can you identify/propose some other?
- Directions for future research

PART II: Your opinion

- is the paper a 'real' advancement of the state of the art?
- is it useful for the theory? for practice?
- can you identify other uses of the technique proposed?
- what are the shortcomings?
- can you identify more? can you propose a fix?
- are there issues swept-under-the-carpet?
- can you identify other directions for future research?

What is planning? *Adapted from Durham Planning Group*

- An active research area within the broader field of Artificial Intelligence (early AI, major conferences, AIPS, ECP)
- It has strong links with scheduling and optimisation research.
- Primary problem:

  Given: Initial conditions, goals, possible actions

  Find: sequences of actions that achieves specified goals
- Planning has traditionally two themes: *domain-independent planning* and *domain-dependent planning*

- *Domain-independent planning* is concerned with the fundamental principles of planning as an activity, typically concentrating on search techniques, search control techniques and the representation and treatment, within a planning problem, of uncertainty, non-determinism, resources, time, functional interdependence and other issues.
- *Domain-dependent planning* is concerned with the application of planning within particular domains, using rich domain knowledge encoded in complex domain models. Typical concerns include the problems of knowledge acquisition and representation and the exploitation of specialist control knowledge in the production of plans and reasoning about planning processes.

Planning has been successfully applied to a range of fielded industrial applications, usually as domain-dependent planning technology that has been informed by domain-independent planning research.

Fielded applications often require more than pure planning technology, relying on scheduling, management of resources and other extensions which are often still beyond the range of current pure domain-independent planners.