What am I doing?

Tran Cao Son

Current Interests

- Logic programming (Answer Set Programming)
- Planning

Answer Set Programming – Idea

- *Given*: problem P
- *Solution:* Encoded P as program Q(P) such that answer sets of Q(P) are solutions of P

Answer Set Programming

- *Planning*
- *Extension*
- *Debugging and ASP Programming environment*

Answer Set Planning

- Can ASP-based planners be competitive with other approaches? Yes/No
  - How to achieve scalability?
    - Interleaving between grounding and answer set computation (difficult!)
  - How to take advantage of heuristics?
  - Attempts
    - Domain dependent knowledge (encoding cumbersome due to lack of *list* constructor, e.g. the list a1;a2;a3 needs to be encoded by the set seq(x), seq(y), head(x,a1), tail(x, y), head(y, a2), tail(y, a3))
    - Approximation reasoning (incompleteness)

Extension to ASP

- *Goal*: making ASP a good knowledge representation language
- What is needed?
  - Aggregates (semantics/implementation)
  - List constructor (or limited list constructor)

Debugging & Programming Environment

- *Goal*:
  - understanding ASP programs
  - providing ASP programmers a tool for testing/debugging their programs
- *Questions*:
  - Why does a program not have answer sets?
  - Why is an atom *a* present in/absent from answer set S?

Planning – Requirement

- *Given:* planning problem P (action theory A, initial state I, goal G)
- *Goal*: a sequence of actions to change state of the world from I to G
- *Problems:*
  - initial state I might be incomplete
  - actions might have duration
  - goals might have deadline

Planning

- *Goal*: algorithms for planning in
  - Conformant planning
  - Planning in real-world applications (with resources, actions with duration, time constraints)
- *Questions:*
  - Can Graphplan idea be used?
  - What will be a good heuristic for planning domains with static causal laws?
  - Can parallelism be of help?

Graphplan Idea

- Graphplan structure
  - simple
  - can be generated efficiently
  - defined for “simple” planning problems (complete information, actions without duration, no resources, etc.)
  - is the source for deriving heuristics

Planning

- *Goal*: algorithms for planning in
  - Conformant planning
  - Planning in real-world applications (with resources, actions with duration, time constraints)
- *Questions:*
  - Can Graphplan idea be used?
  - What will be a good heuristic for planning domains with static causal laws?
    - There exists no heuristics for this situation
  - Can parallelism be of help?