Progressing Intention Progression

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Intention Progression

• a key problem for intelligent agents is *what to do next*

• an agent typically has multiple goals to achieve and multiple ways of achieving each goal

• at any given point the agent must decide which goal to work on, and how to achieve the goal

• more precisely, *which intention to progress*
Central to BDI & AI

• the *intention progression problem* (IPP) is central to Belief-Desire-Intention agents

• also related to many areas of AI, including planning (especially HTN planning), scheduling, reasoning about actions, etc.

• research on intention progression has a long history, but suffers from *fragmentation* and a *lack of common terminology, data formats and tools*
An Intention Progression
Competition
Why a competition?

- competitions are increasingly being used to incentivise research in AI & CS, e.g., RoboCup, IPC, TAC, etc.

- competitions serve at least four purposes:
  
  1. provide common terminology, data formats & problem instances
  
  2. allow scientific comparison of approaches
  
  3. foster good software engineering and robustness of approaches
  
  4. raise the profile of an area
Defining intention progression

• to compare different approaches to the IPP, we need to specify:
  
  - sets of intentions (and perhaps how they change over time)
  
  - the environment in which intentions are to be progressed (and perhaps how it changes)
  
  - what it means to progress a set of intentions ‘well’
Goal-Plan Trees

- A BDI agent program consists of a set of pre-defined plans that are used to achieve the agent’s goals.
- Each plan consists of steps that are either basic actions or sub-goals.
- Each sub-goal is in turn achieved by another plan.
- This relationship is naturally represented as a tree structure called a goal-plan tree (GPT).
GPTs & intentions

• GPTs are a natural *abstract* representation of the execution of an agent’s intentions

• capture the choices available to an agent:
  - which step of which intention to execute next, and how

• provide a framework for recording information relevant to intention progression:
  - e.g., pre- and postconditions of actions and plans, resource usage, durations, etc.
which intention should we progress next?
Environment & utility

- environment may be static or dynamic; basic actions may be deterministic or nondeterministic
- environment may produce new top-level goals at run time
- a ‘good’ progression may be an interleaving that achieves the largest number of goals, largest number of highest priority goals, largest number of goals by their deadline …
What next?
Call for Participation

- all the ideas so far are preliminary

- we need people from the community (especially the EMAS community) to:
  - help in formulating the precise rules of the competition
  - help in organising/running the competition itself
  - enter the competition :-)

### Provisional timeline

<table>
<thead>
<tr>
<th>Month</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2017</td>
<td>Expressions of interest</td>
</tr>
<tr>
<td>July 2017</td>
<td>Formation of steering committee &amp; organisers</td>
</tr>
<tr>
<td>September 2017</td>
<td>Draft competition rules published for comment</td>
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<tr>
<td>October 2017</td>
<td>Competition rules finalised; first CfP</td>
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<tr>
<td>January 2018</td>
<td>Collection of test cases completed</td>
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<tr>
<td>April 2018</td>
<td>Competition platform available</td>
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<tr>
<td>June 2018</td>
<td>Final code submission</td>
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<tr>
<td>July 2018</td>
<td>Competition results announced at AAMAS 2018</td>
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More information

• website: intentionprogression.org

• email: intentionprogression@googlegroups.com

• ‘Blue Skies’ paper presentation, Session 3D: Planning, Thursday 11:20 – 13:00, Ballroom 4

• Poster Session D, Thursday 16:10 – 17:10, Sao Paulo 1&2