Adaptive lookahead planning for performing music composition
Dimitri Bouche, Jean Bresson

To cite this version:
Dimitri Bouche, Jean Bresson. Adaptive lookahead planning for performing music composition. The 25th International Conference on Automated Planning and Scheduling (ICAPS), Jun 2015, Jerusalem, Israel. 2015. <hal-01163294>
Adaptive lookahead planning for performing music composition

Dimitri Bouche – Jean Bresson
UMR 9912 STMS IRCAM-CNRS-UPMC / Paris, France
{bouche,bresson}@ircam.fr

Context

- Creating music amounts to write (compose) and perform (live)
- Composition can last an indefinite time
- Performance has a timeline defined during composition

Adaptive lookahead (dynamic vs. static)

<table>
<thead>
<tr>
<th>Dynamic object</th>
<th>Static object</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="example1.png" alt="Graph" /></td>
<td><img src="example2.png" alt="Graph" /></td>
</tr>
</tbody>
</table>

likely to be modified while being rendered
will never change

Compositional processes that generate or modify musical structures can be integrated in musical objects, and occur during the performance

Planning of a musical object

- play-chord
- play-note
- note-on
- note-off

Dynamic lookahead extension

Plan « just in time » in a time-window

Possibility to extend this time-window

<table>
<thead>
<tr>
<th><img src="example3.png" alt="Graph" /></th>
<th><img src="example4.png" alt="Graph" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>short anticipation</td>
<td>larger anticipation</td>
</tr>
</tbody>
</table>

Planning and scheduling operation scheme

Data structure

- object to plan
- translation
- editions

Environment & Compositional Processes

- Computer-music environment: react to user inputs
- Process tasks: non preemptible, best-effort
- Integrate results in the data structure
- Notify the planner about editions

Planner

- Register playing objects
- Store time-windowed plans
- Extract new plans from the data structure according to queries or notifications

Scheduler

- Synchronously render plans
- Query the planner for new plans after depletion
- Trigger compositional processes as « tasks »
- Time updates (graphics, callbacks etc.)

Example

- Tasks triggering compositional processes
- Results of compositional processes

EFFICAC(e) ANR-13-JS02-0004-01 : http://repmus.ircam.fr/efficace/
Download OpenMusic : http://repmus.ircam.fr/openmusic/