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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

HAL Id: hal-01163294
https://hal.archives-ouvertes.fr/hal-01163294
Submitted on 12 Jun 2015

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Adaptive lookahead planning for performing music composition

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Context

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

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

Adaptive lookahead (dynamic vs. static)

Dynamic object

Static object

likely to be modified while being rendered
will never change

Planning and scheduling operation scheme

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.)

Data structure

Object to plan

Plan « just in time » in a time-window

Possibility to extend this time-window

short anticipation
larger anticipation

Dynamic lookahead extension

Plan « just in time » in a time-window

Possibility to extend this time-window

Planning of a musical object

Dynamic lookahead extension

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

Scheduler

Tasks triggering compositional processes

1 2 3 : Results of compositional processes