On the Execution of Deep Models
Colin Atkinson, Ralph Gerbig and Noah Metzger
Areas for Deep Modeling

- We see potential for the application of deep models in
  - Representation of execution state
  - Online influencing of model execution
  - Pause/resume model execution

- In “two-level models” workarounds are applied, such as
  - Model Copies
  - UML Profiles
  - Annotation Models
  - Promotion transformations
The Example

- Two players play against each other from the birds eye perspective
- The game is an executed deep-model
- The model and game are connected via sockets
- Changes in to the model/game are immediately reflected at the other end.
- A third player can change the model at execution time and changes take immediate effect
The Game in a “two-level” Style

Concrete Syntax

Software Engineering
Prof. Dr. Colin Atkinson
Execution of Model

Level 1

- Shield (weight 0.001)
- Shuriken (weight 0.005)
- Rocket (weight 0.005)
- Telekinesis (weight 0.001)

Images of different levels of a game with various objects and characters.
Representing Execution State 1/2

- How can a move be represented at M1?
Representing Execution State 2/2

How can a change to health be represented at M1?
Influencing Model Execution 1/2

• I want to move a wall during model execution!
• I want to change the regeneration speed of a weapon during execution!
Pause/Resume Model Execution State

- I would like to pause the game and resume later!
The Execution Blueprint is polluted through
- Transforming the blueprint to an execution state model
- Applying the changes to all future executions of this model

One Solution
- Copy the blueprint for each execution

Problem
- Checking of conformance of a blueprint copy and the original blueprint is not covered by modeling frameworks
- Keep evolution of blueprint and all copies in synch
Conclusions

- All scenarios presented here can be supported with additional coding effort today. But deep-modeling provides these features out of the box.

- The instance level can be used to ....
  - ... represent execution state information ...
  - ... allow modification at execution time ...
  - ... suspend / resume models ...

- ... in an optimal way.

- Semantics of models can be defined through
  - Deep ATL Transformations
  - Java Plug-ins
  - other ways have to be explored yet (e.g. deep action language)

- The next steps are
  - Test if fUML is implementable in Melanee and if it brings advantages over two-level technology
  - Provide a network protocol to query and manipulate deep models
Thank You!

- Visit us!
- Melanee Webpage - [http://www.melanee.org](http://www.melanee.org)

Colin Atkinson  
atkinson@informatik.uni-mannheim.de

Ralph Gerbig  
gerbig@informatik.uni-mannheim.de

Noah Metzger  
nometzge@mail.uni-mannheim.de