Interface Variability in Family Model Mining

David Wille, Sönke Holthusen, Sandro Schulze and Ina Schaefer,
August 27, 2013
Motivation

Identifying differences and commonalities is crucial!
Example
Family Models

- Hierarchical model
- Model solution space
- Model commonalities and differences
- Part of *pure::variants* by *pure systems*
Problem

Input:

Approach:
- Walk through model
- Compare components and connectors

Output:
- Similarity of models in %
- Variability between models

A metric is needed!
**Metric**

**Components**

- **name**: 75%
- **outports**: 10%
- **inports**: 10%
- **function**: 5%

**Connectors**

- **name**: 75%
- **destination**: 10%
- **source**: 10%
- **datatype**: 5%

**Overall similarity:**

\[
\text{similarity} = \frac{2}{3} \cdot \text{similarity}_{\text{components}} + \frac{1}{3} \cdot \text{similarity}_{\text{connectors}}
\]
Creating the Family Model

Compared model

Base model

**mandatory:** \( \geq 95\% \)

**alternative:** > 0\% and < 95\%

**optional:** 0\%

**mandatory:** 100\%

**mandatory:** 95\%

**alternative:** 15\%

**optional:** 0\%

\(~ 52.5\%\)

August 27, 2013 | David Wille, Sönke Holthusen, Sandro Schulze and Ina Schaefer | Page 7

Interface Variability in Family Model Mining
Workflow

Import (XML-Parser) → ADL-File → Intermediate format → EMF-Meta Model → Analyze → Compare Tree

Exchangeable metric → Export (pure::variants) → pure::variants Family Model

August 27, 2013 | David Wille, Sönke Holthusen, Sandro Schulze and Ina Schaefer | Page 8
Interface Variability in Family Model Mining
Conclusion

- Automatically analyze different models
- So far only models without hierarchy
- Calculate overall similarity according to metric
- Interface variability is considered
- Identify commonalities and differences
- Detected variability stored in family model
- Could be applied to different languages:
  - e.g. MATLAB/Simulink, SCADE, ASCET, …