Feature Model to Orthogonal Variability Model Transformation towards Interoperability between Tools

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Where I came from?

Ijuí, Brazil
Seville, Spain
Introduction

Software Product Lines

What’s it?
A new software development paradigm

Characterise
Software Reuse

Generates

Variability Models

such as

Feature Models and

Orthogonal Variability Models

Introduction Software Product Lines

What's it? A new software development paradigm

Characterise Software Reuse

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Introduction

Our research problem:

Feature Models

Orthogonal Variability Models

Software Product Lines (SPL)

A new software development paradigm

Reuse

Software

What?

Characterise

Variability Models (VM)

Generates such as Feature Models and Orthogonal Variability Models

Our research problem:

Feature Models

Orthogonal Variability Models
Research context

Our goal

Our ideas

Issues
Documents and manage the variability of SPL

Research context
Software Product Lines

Common features
- Alarm clock
- Calls
- Messaging

Variable features
- Media
- Games
- Connectivity

Variability Model

- Documents and manage the variability of SPL
Research context
FM and OVMs

Feature Models

Orthogonal Variability Models
Our goal
The transformation: FM2OVM

Why?
Interoperability between FM and OVM tools:

- Providing **multiple views** of the variability
- Integrating specially **analysis tools**
Our goal
Multiple views
Our goal
Integrating tools

How many products does the model represent?
Are there any errors?
Our goal
Integrating tools

Can we use model transformation to provide analysis on OVM or should we develop another analysis tool?
Research context

Our goal

Our ideas

Issues
FM2OVM algorithm

Select each feature n in FM

- n in core features or n is the root?
  - yes: Transform parent(n) in VP
  - no:
    - parent(n) in core features?
      - yes
        - Set VP type as MANDATORY VP
      - no
        - n is solitary feature?
          - yes
            - Transform n in SOLITARY VARIANT
          - no
            - Transform n in GROUPED VARIANT

- Set relationship between VP and V as SE?
  - yes
  - Set cardinality
  - no
  - Set relationship between VP and V as OPTIONAL
  - no
  - Set relationship between VP and V as MANDATORY
Research context
Our goal
Our ideas
Issues
To preserve decomposition edge semantics we need to use constraints.

\[ \text{Media} \rightarrow \text{MobilePhone} \land \text{MP3} \leftrightarrow \text{Media} \land \text{Camera} \rightarrow \text{Media} \]
Issues

- Bidirectional semantics to integrate analysis tools.
- Deal with commonalities

Future work

- Use model- to-model transformation
- Implement our algorithm by using graph transformation tool, such as MOMENT
- Implement bidirectional transformation
Thank you!

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