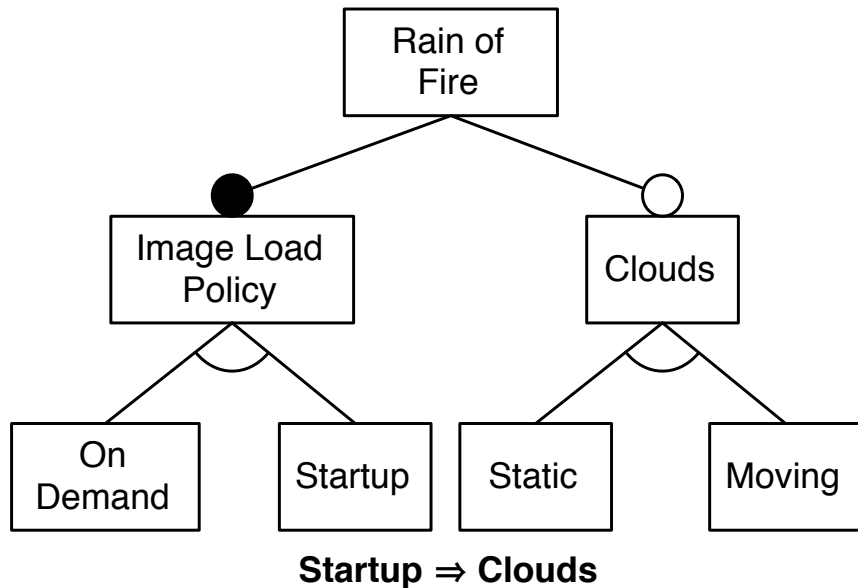


A Comparative Study of Configuration Knowledge in Product Derivation Approaches

UFPE, PUC-Rio, UFRN

How are features connected to their realization?



configuration knowledge



.java

```
classdef RainOfFire {
    classdef ImageLoadPolicy {
        classdef OnDemand
        classdef Startup
        classdef Static
    end
    classdef Clouds {
        classdef Static
        classdef Moving
    end
end
```

.xml

```
<target name="build-classes" depends="build-classes" >
    <java destdir="build/classes" >
        <classpath refid="build-classpath" />
        <src dir="src" />
    </java>
</target>
```

.aj

```
classdef RainOfFire {
    classdef ImageLoadPolicy {
        classdef OnDemand
        classdef Startup
        classdef Static
    end
    classdef Clouds {
        classdef Static
        classdef Moving
    end
end
```

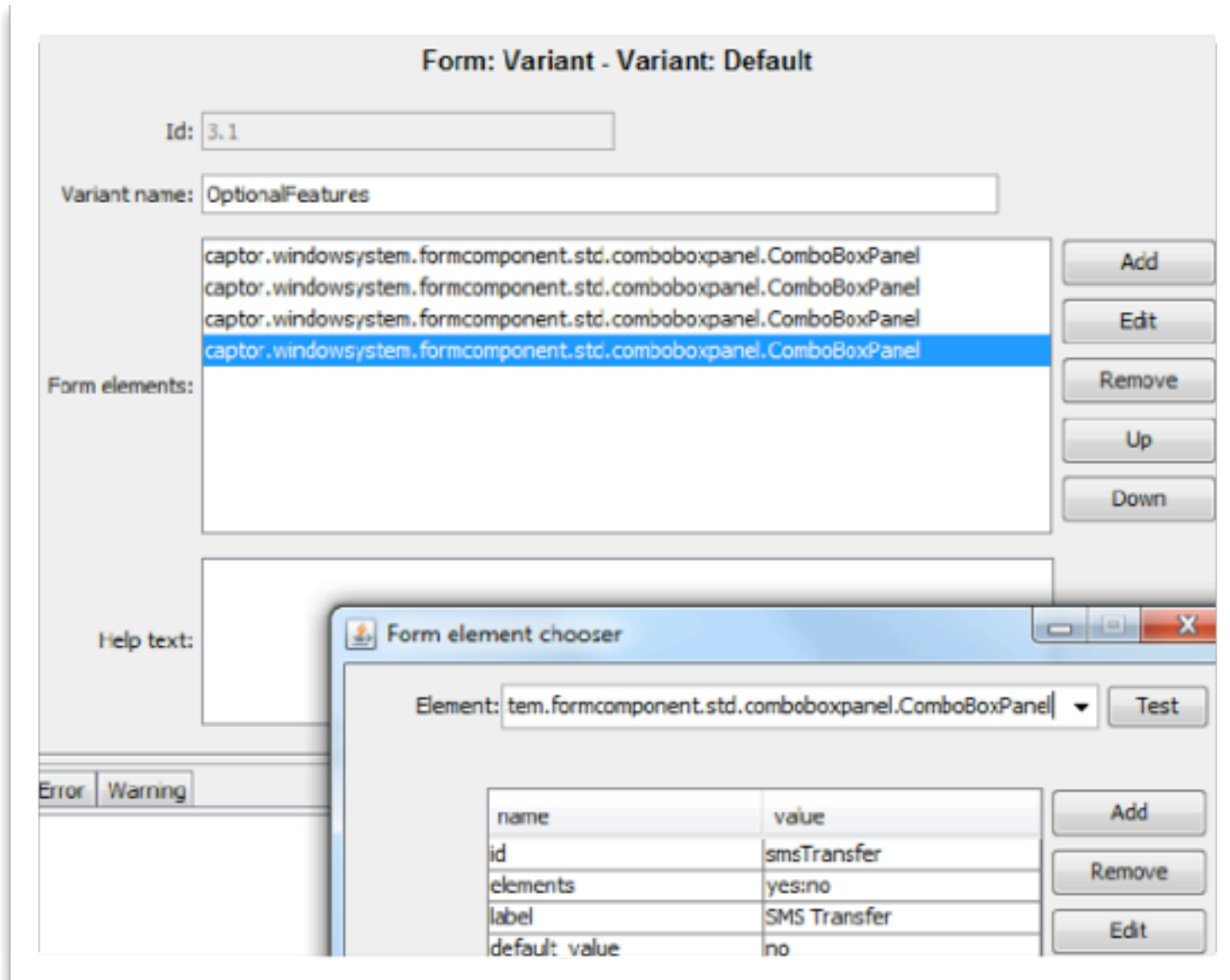
.jpg

this knowledge might be implicit and scattered

Empirical Evaluation

- Six approaches specifying MobileMedia r07
- Metrics Suite for CK
- Qualitative assessment

Captor










CIDE

```
public class PhotoViewScreen extends Canvas {  
    public static final Command copyCommand = new Command("Copy", Command.ITEM, 1);
```

| ← **Hidden Feature**

GenArch

↔ Mapping Relationships

- ▲  Component optional
 - ▲  Aspect VideoAndOptionalFeatures.aj
 - ◆ Feature Expression Video
 - ▲  Aspect SortingAndFavoritesAndCopyAndSMS.aj
 - ◆ Feature Expression Sorting and Favourites and CopyMedia and SMSTransfer
 - ▲  Aspect SortingAndFavoritesAndCopy.aj
 - ◆ Feature Expression Sorting and Favourites and CopyMedia
 - ▲  Aspect SortingAndFavorites.aj
 - ◆ Feature Expression Sorting and Favourites
- ▷  Component sorting
- ▷  Component sms

MSVCM

Feature Expression	Assets
Rain of Fire	Game.java, GameScreen.java
On demand ∨ Startup	CommonImgLoad.java
On demand	OnDemand.aj
Startup	StartUp.aj
Clouds	Clouds.java
Static	CloudsStatic.aj
Moving	CloudsMotion.aj

pure::variants

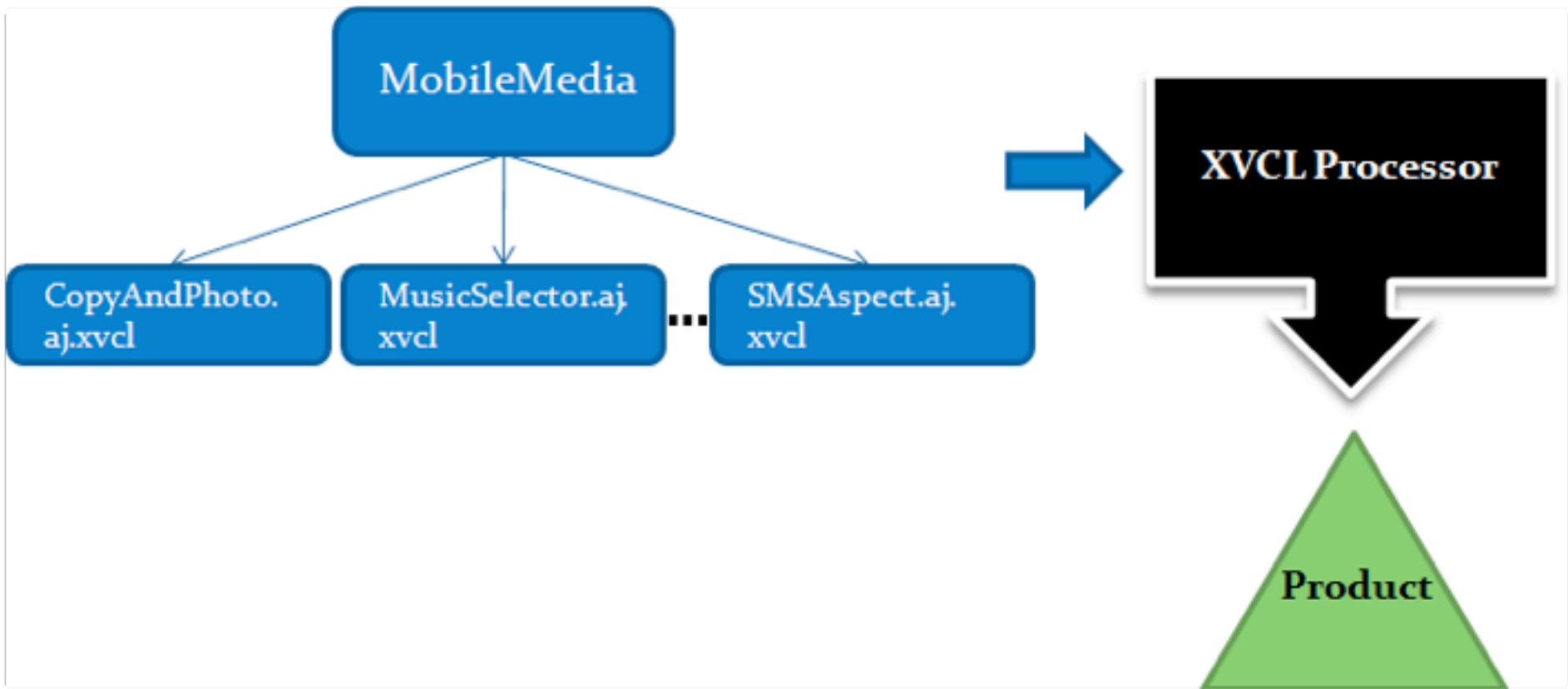
The screenshot shows a project tree on the left with the following structure:

- MobileMediaFamily
 - Alternative
 - Optional
 - Photo
 - ps:class: AbstractPhotoAspect** (highlighted)
 - ps:file: AbstractPhotoAspect
 - ps:class: PhotoAspect
 - ps:class: ImageAlbumD
 - ps:class: ImageMediaA
 - ps:class: PhotoViewScr
 - ps:class: PhotoNotVide
 - ExceptionBlocks
 - Optional
 - Music
 - Video

The properties window for 'ps:class: AbstractPhotoAspect' displays the following information:

Id:	iKclcgoHyeOIKH6WC
Unique Name:	AbstractPhotoAspect
Visible Name:	AbstractPhotoAspect
Class:	ps:part
Type:	ps:class
Default Selected:	on
Model:	MobileMediaFamily
Restrictions:	hasFeature('Photo')

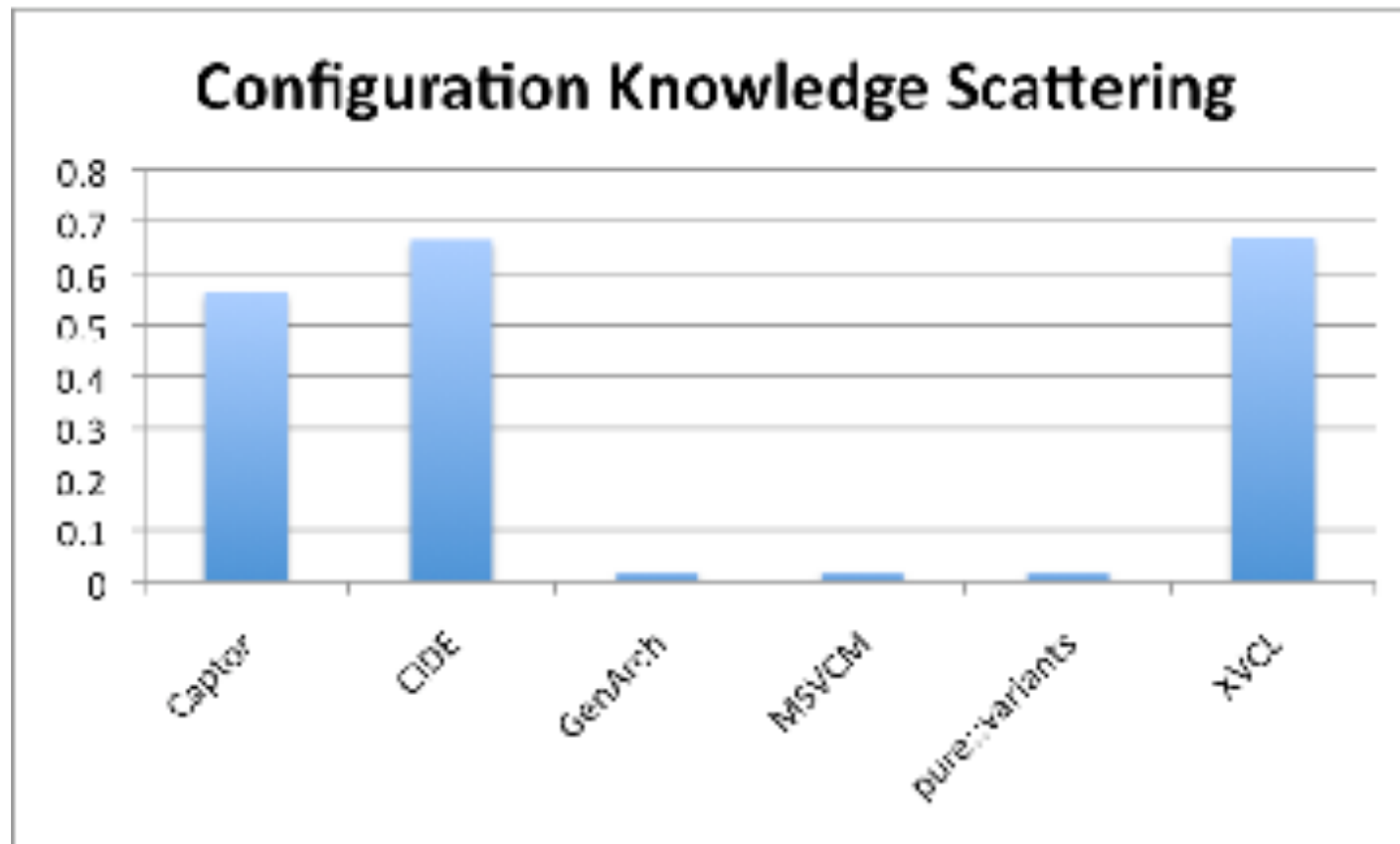
XVCL



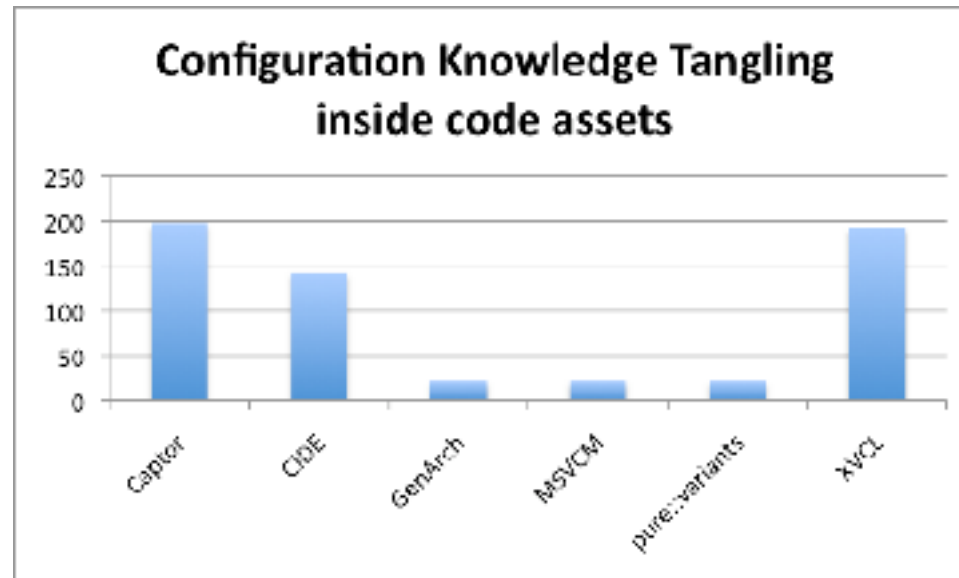
Study Settings

- Metrics suite
 - CK Scattering (similar to DOS/CDC)
 - CK Tangling in Code Assets (similar to CDLoC)
- Criteria set
 - Feature Expressions
 - Composition Mechanism
 - Asset Configuration Level
 - Conciseness of CK specification
 - Safe Composition
 - Visualization of CK

CK Scattering



CK Tangling



Summary

	Captor	CIDE	GenArch	MSVCM	PV	XVCL
Feature Expressions	Partially Supported	Partially Supported	Supported	Supported	Supported	Partially Supported
Config	Fine and Coarse	Fine	Fine and Coarse	Fine and Coarse	Fine and Coarse	Fine and Coarse
Concise	Duplicate entries	N/A	Assets => Feature Exp.	Feature Exp. => Assets	Assets => Feature Exp.	Duplicate entries
Safe Comp.	Not Supported	Supported	Not Supported	Supported	Not Supported	Not Supported
Visualization	Not Supported	Views over Features and Variants	Through the CK Model	Through the CK Model	Through the CK Model	Not Supported

Feature Expressions

$(\text{Photo} \wedge (\neg(\text{Music})) \wedge (\neg(\text{Video}))) \vee$

$(\text{Music} \wedge (\neg(\text{Video})) \wedge (\neg(\text{Photo}))) \vee$

$(\text{Video} \wedge (\neg(\text{Music})) \wedge (\neg(\text{Photo})))$

```
<select option="Photo"><option value="yes">
<select option="Music"><option value="no">
  <select option="Video"><option value="no">
    <adapt x-frame="OneAlternativeFeature.aj.xvcl"
      outfile="OneAlternativeFeature.aj" />
  </select> ... and other closing tags
```

```
<select option="Photo"><option value="no">
<select option="Music"><option value="yes">
  <select option="Video"><option value="no">
    <adapt x-frame="OneAlternativeFeature.aj.xvcl"
      outfile="OneAlternativeFeature.aj" />
  </select> ... and other closing tags
```

```
<select option="Photo"><option value="no">
<select option="Music"><option value="no">
  <select option="Video"><option value="yes">
    <adapt x-frame="OneAlternativeFeature.aj.xvcl"
      outfile="OneAlternativeFeature.aj" />
  </select> ... and other closing tags
```

Discussion

- XVCL does not contemplate FMs
- Feature expressions in CIDE
- CK modularization is beneficial
 - related to MSVCM results
- CK visualization is important
 - related to metrics

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