

Using Multiple Feature Models to Design Applications for Mobile Phones

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Outline

- Industrial context
- Our proposition: AppliDE
 - Handling functional variability
 - Handling device variability
- Conclusion & Perspectives

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- Industrial context
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Industrial context



Industrial context



Industrial context



symbian

Industrial context



symbian



250,000+ (07/11)



425,000+ (06/11)

<http://www.appbrain.com/stats/number-of-android-apps>

<http://developer.apple.com/wwdc/>

Downloaded applications (billions)	
2009	2,4
2010	8,2
2011	+ 17

Gartner

Challenges

C_1 : functional variability



C_2 : device variability



Challenges

C_1 : functional variability



C_2 : device variability



C_1 : SPL approach

Challenges

C_1 : functional variability



C_2 : device variability



C_1 : SPL approach

C_2 : Rhomobile, PhoneGap, Titanium, MoSync

Challenges

C_1 : functional variability



C_2 : device variability



C_1 : SPL approach

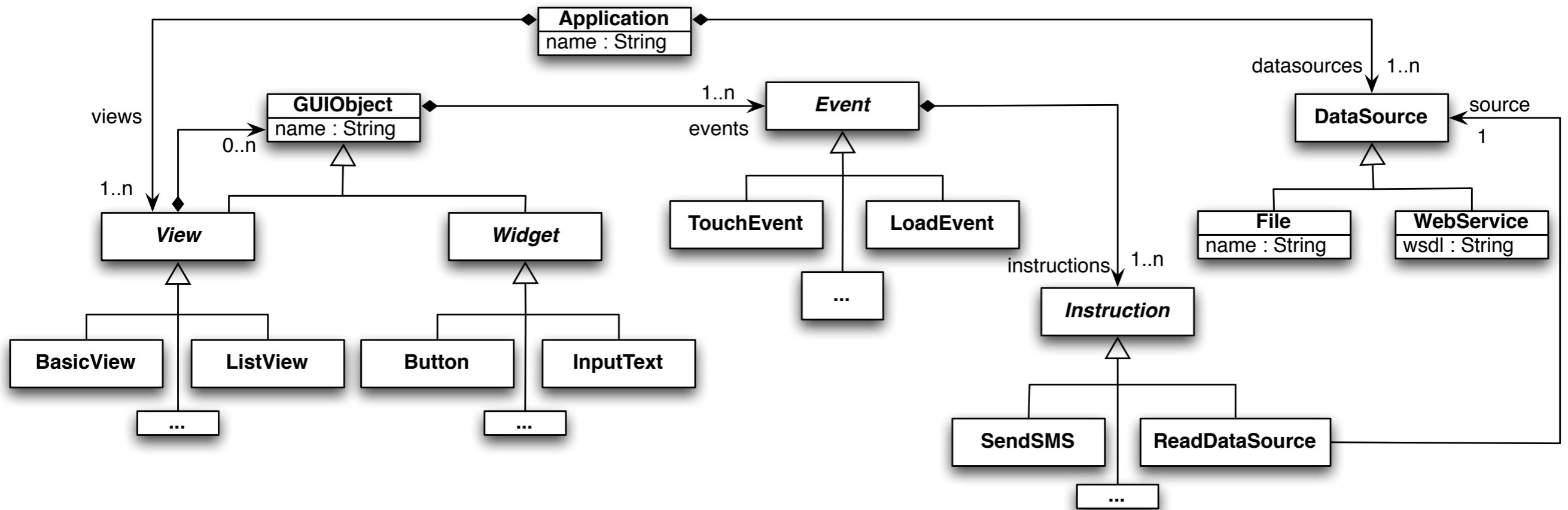
C_2 : Rhomobile, PhoneGap, Titanium, MoSync

***AppliDE* $\Rightarrow C_1 + C_2$**

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- **Our proposition: AppliDE**
 - Handling functional variability
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AppliDE meta-model



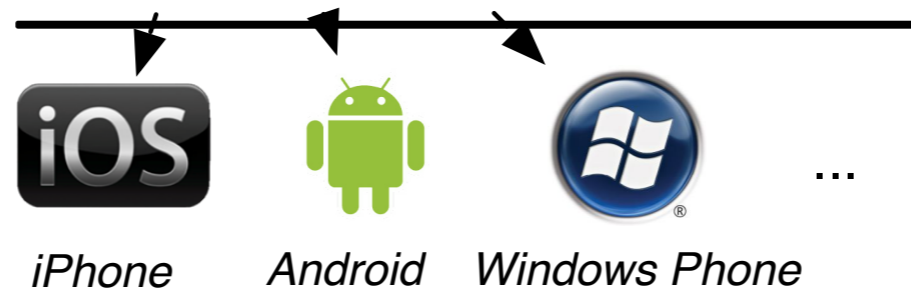
- 73 concepts in 4 packages

- Data
- Action
- Event
- GUI

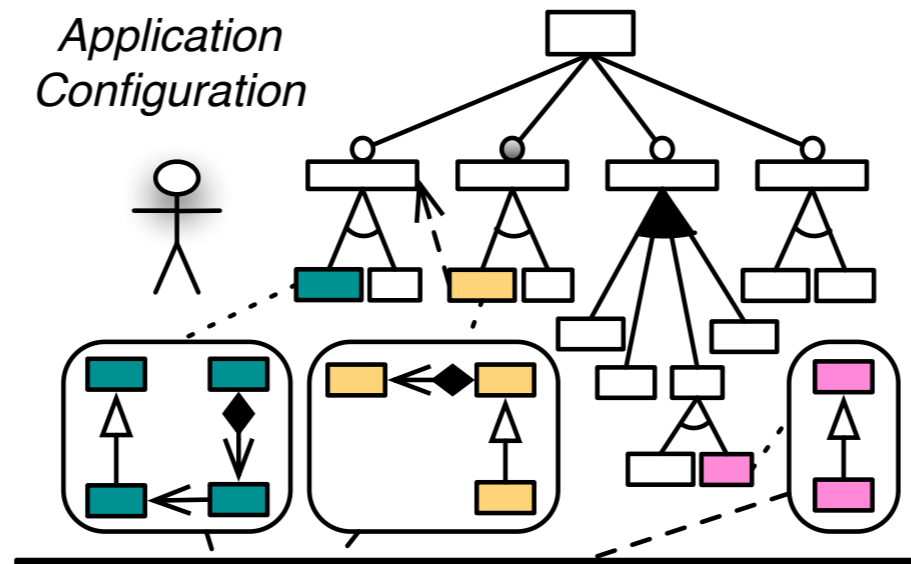
Our contribution: AppliDE

C_1 : functional
variability

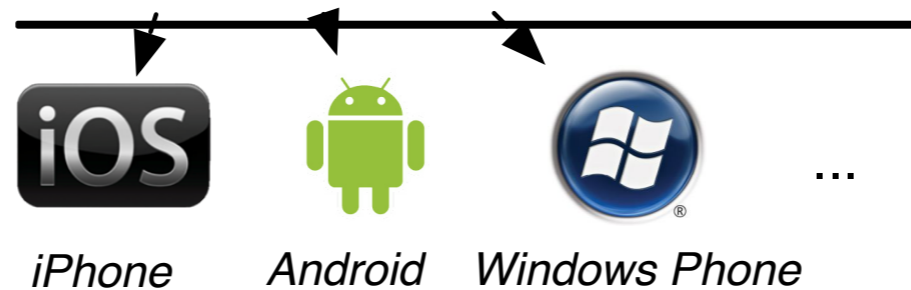
C_2 : device
variability



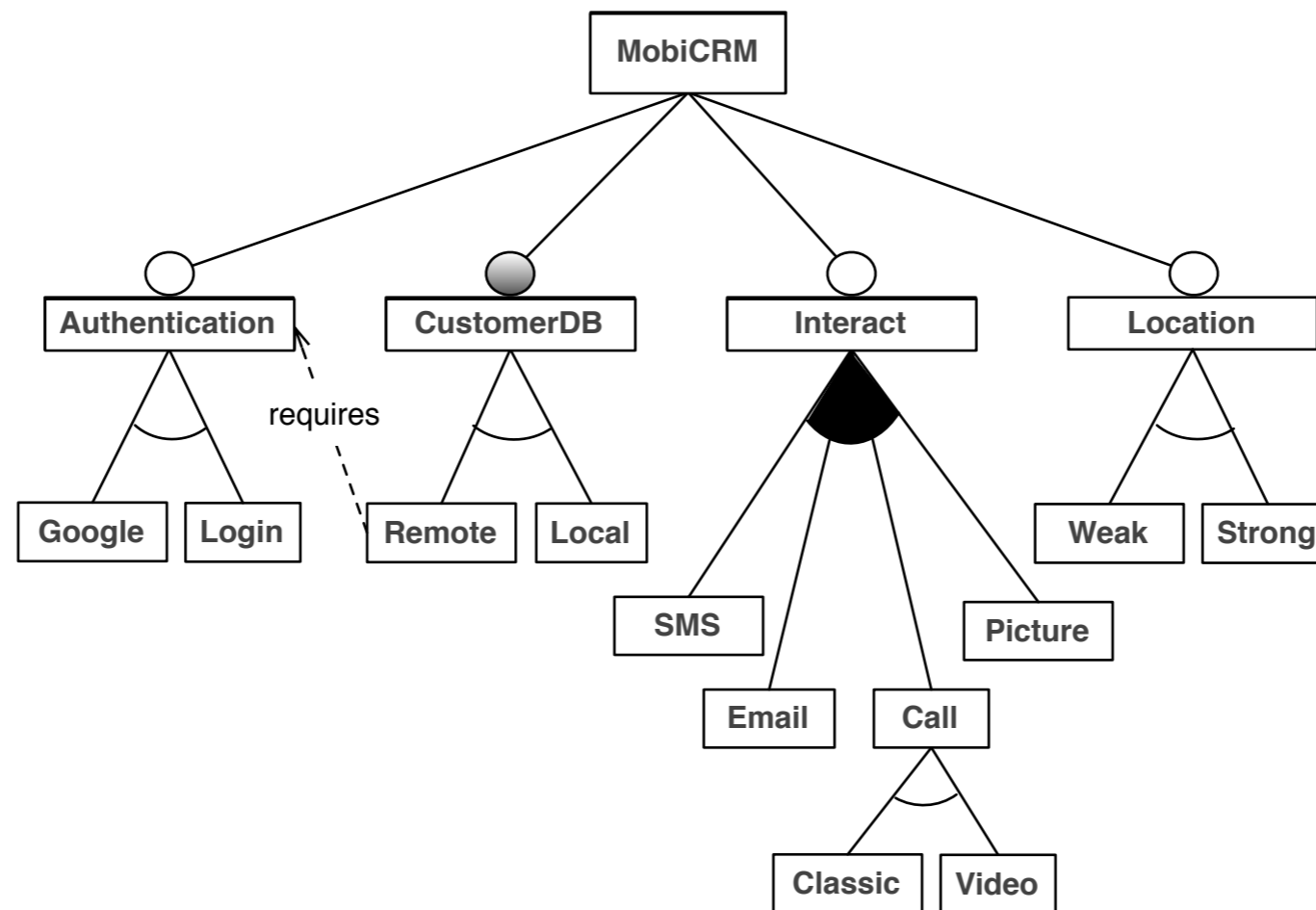
Our contribution: AppliDE



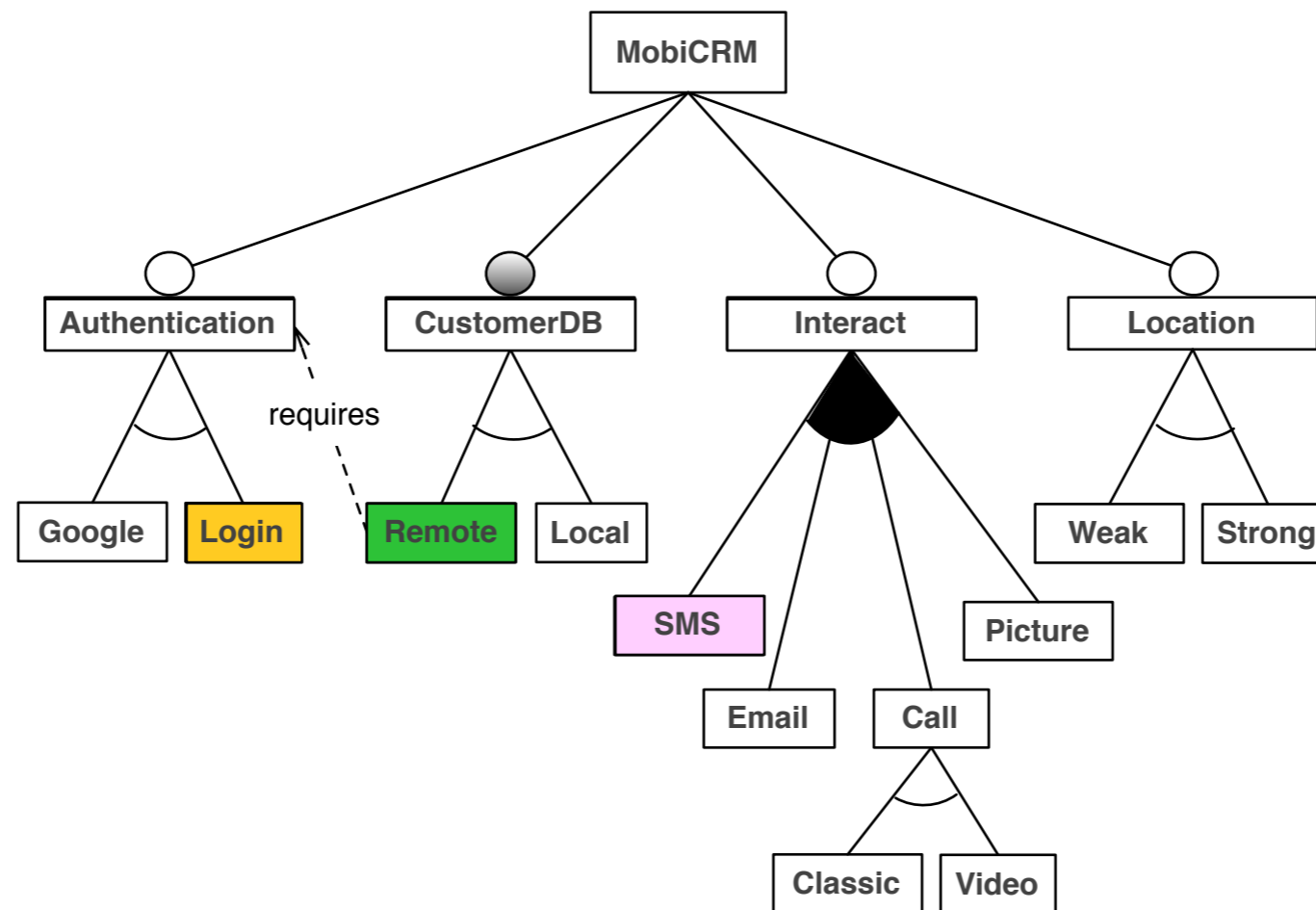
C₂: device
variability



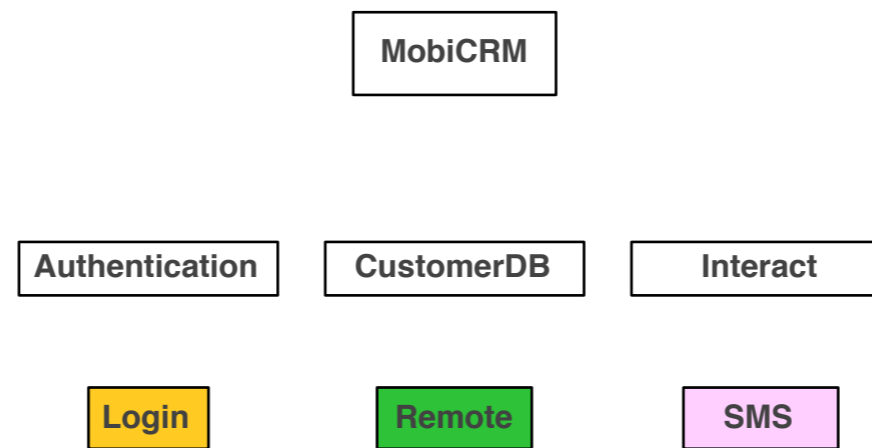
C₁: functional variability



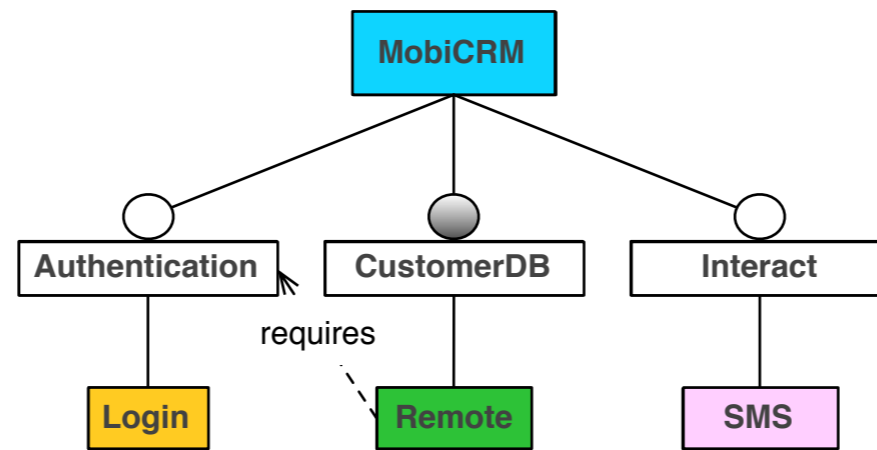
C₁: functional variability



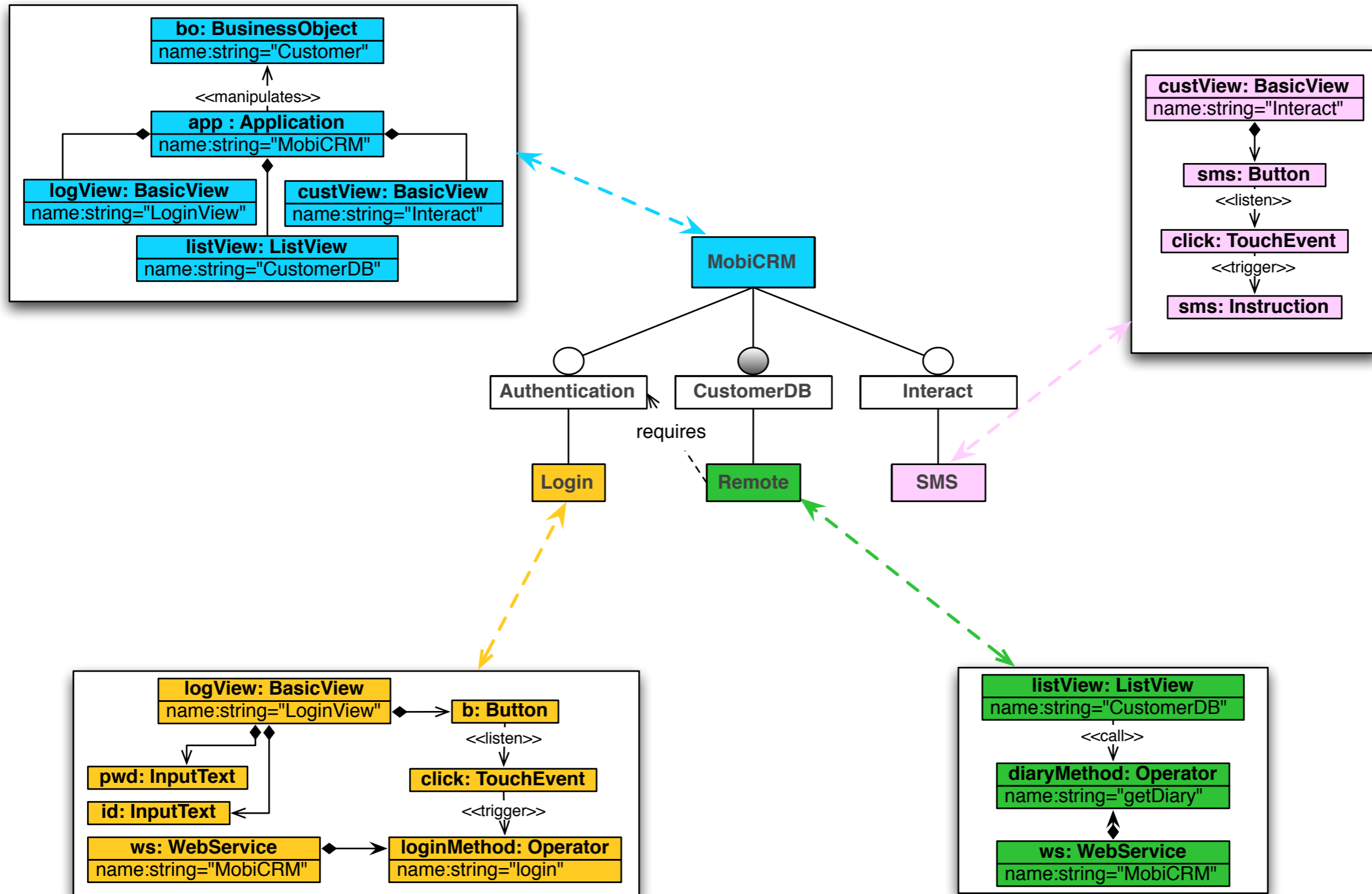
C₁: functional variability



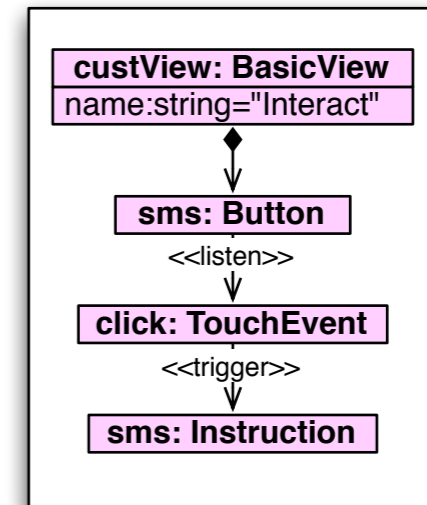
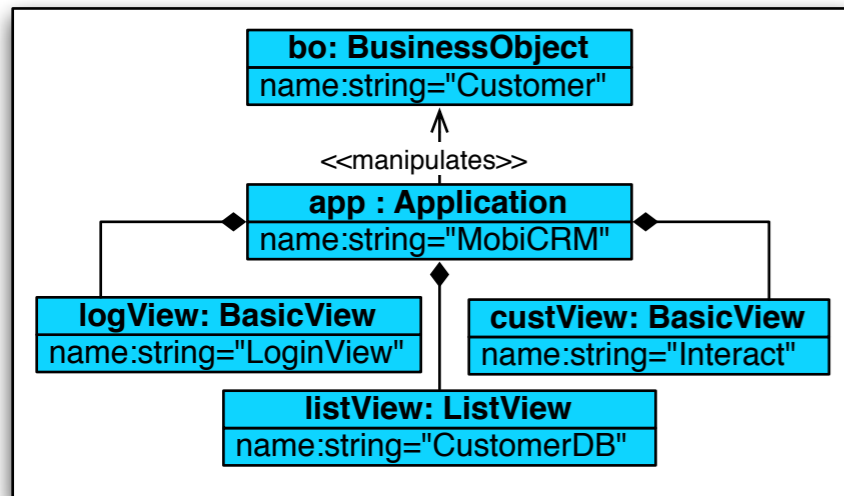
C₁: functional variability



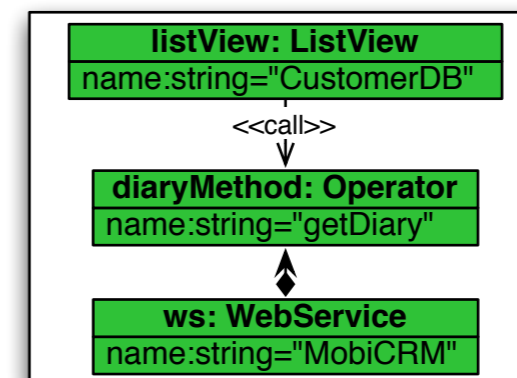
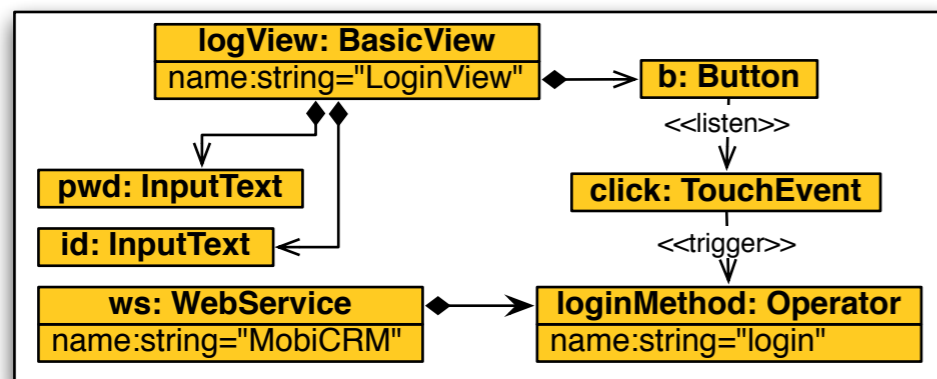
C₁: functional variability



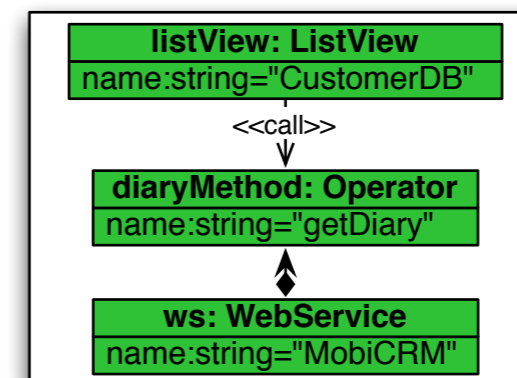
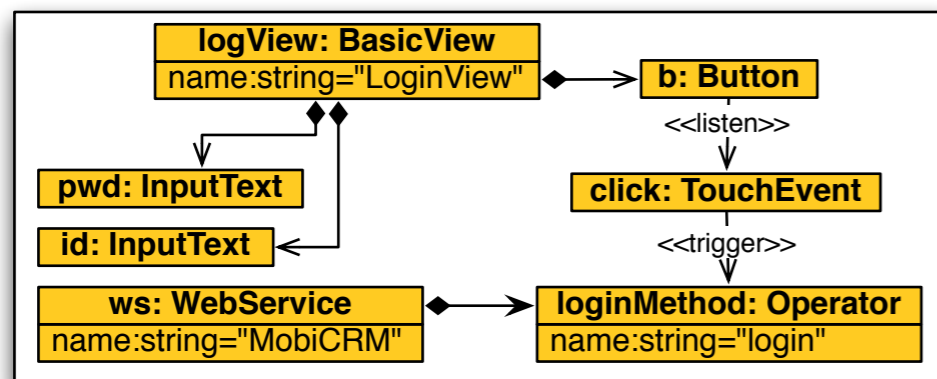
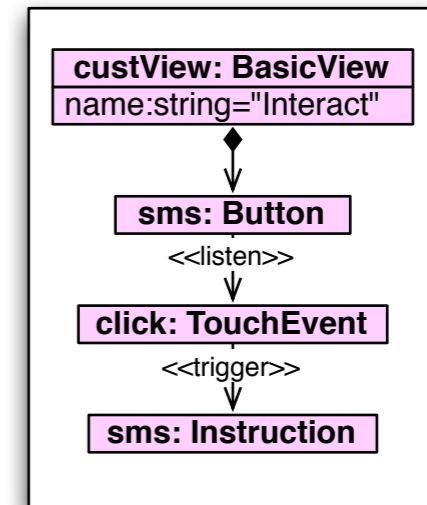
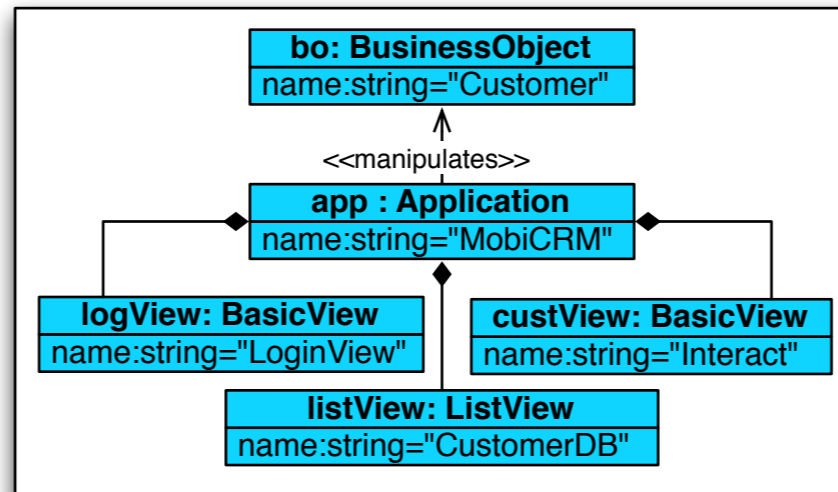
C₁: functional variability



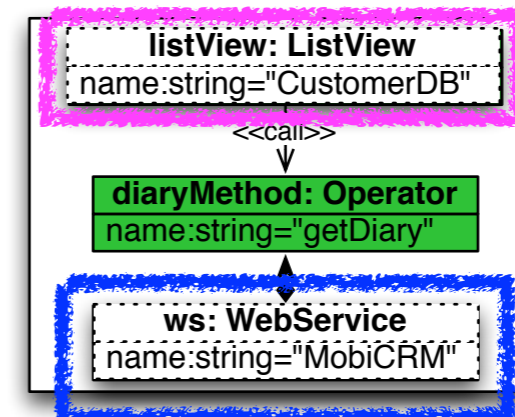
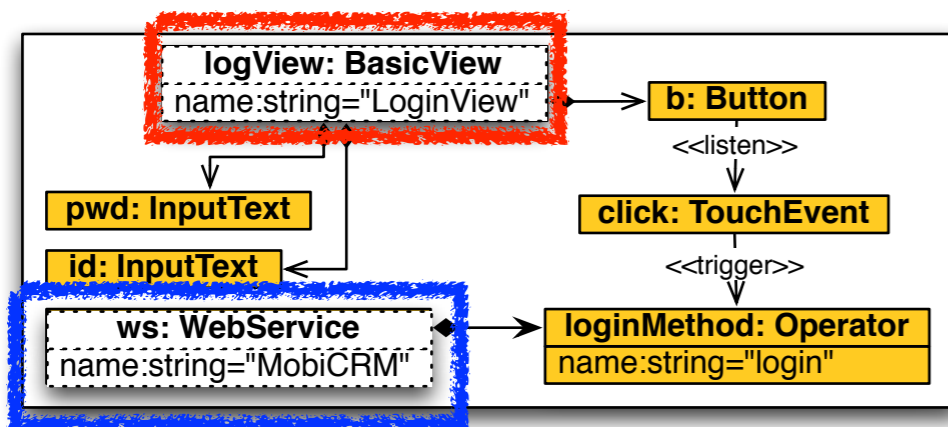
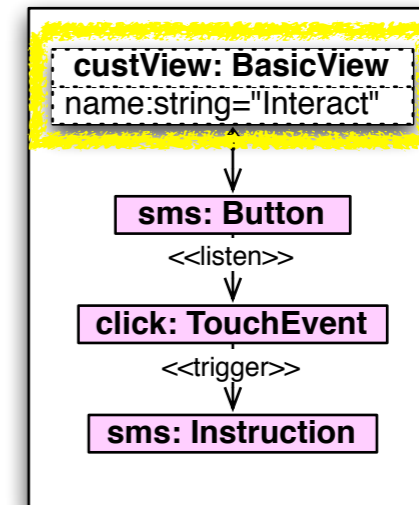
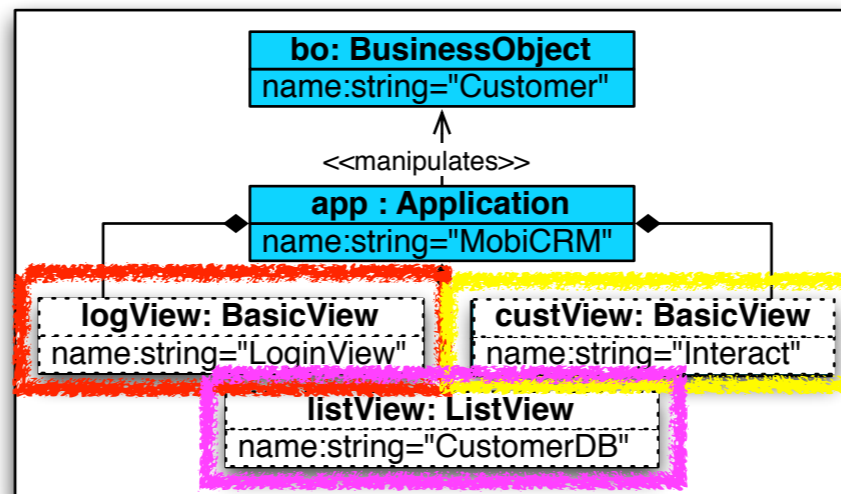
Merge



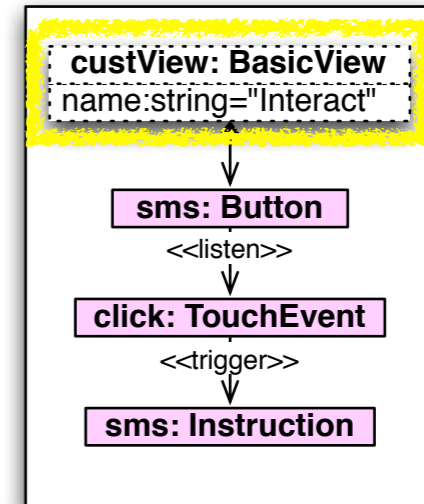
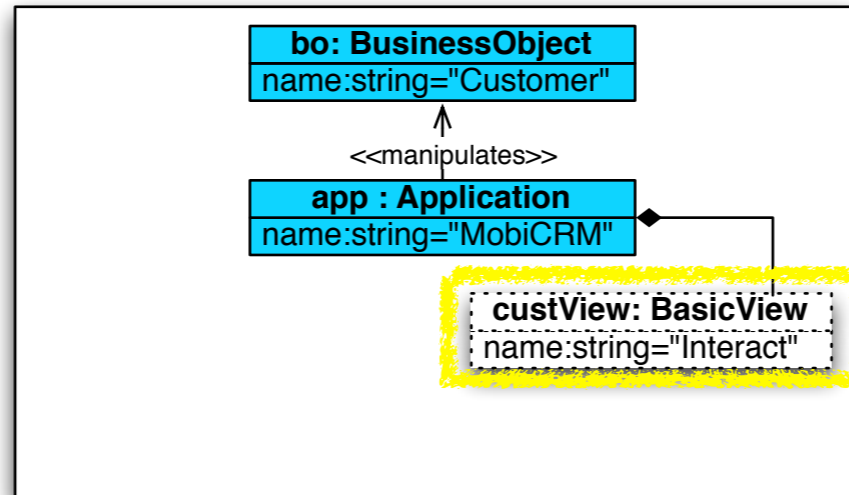
C₁: functional variability



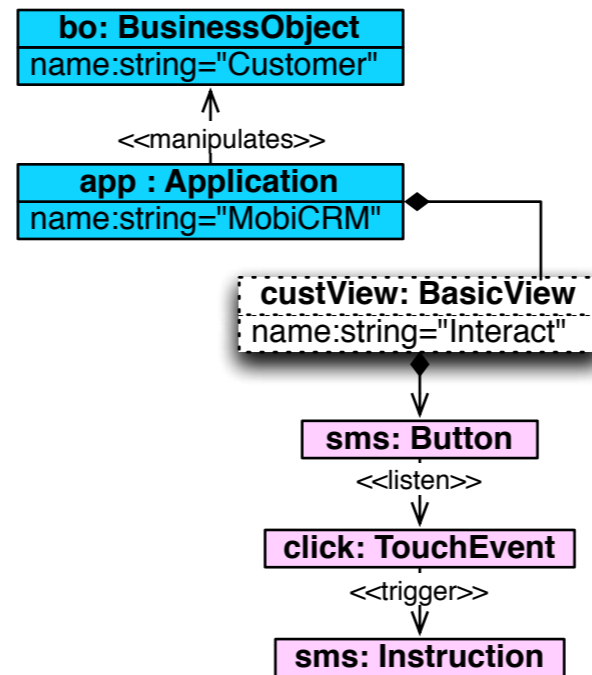
C₁: functional variability



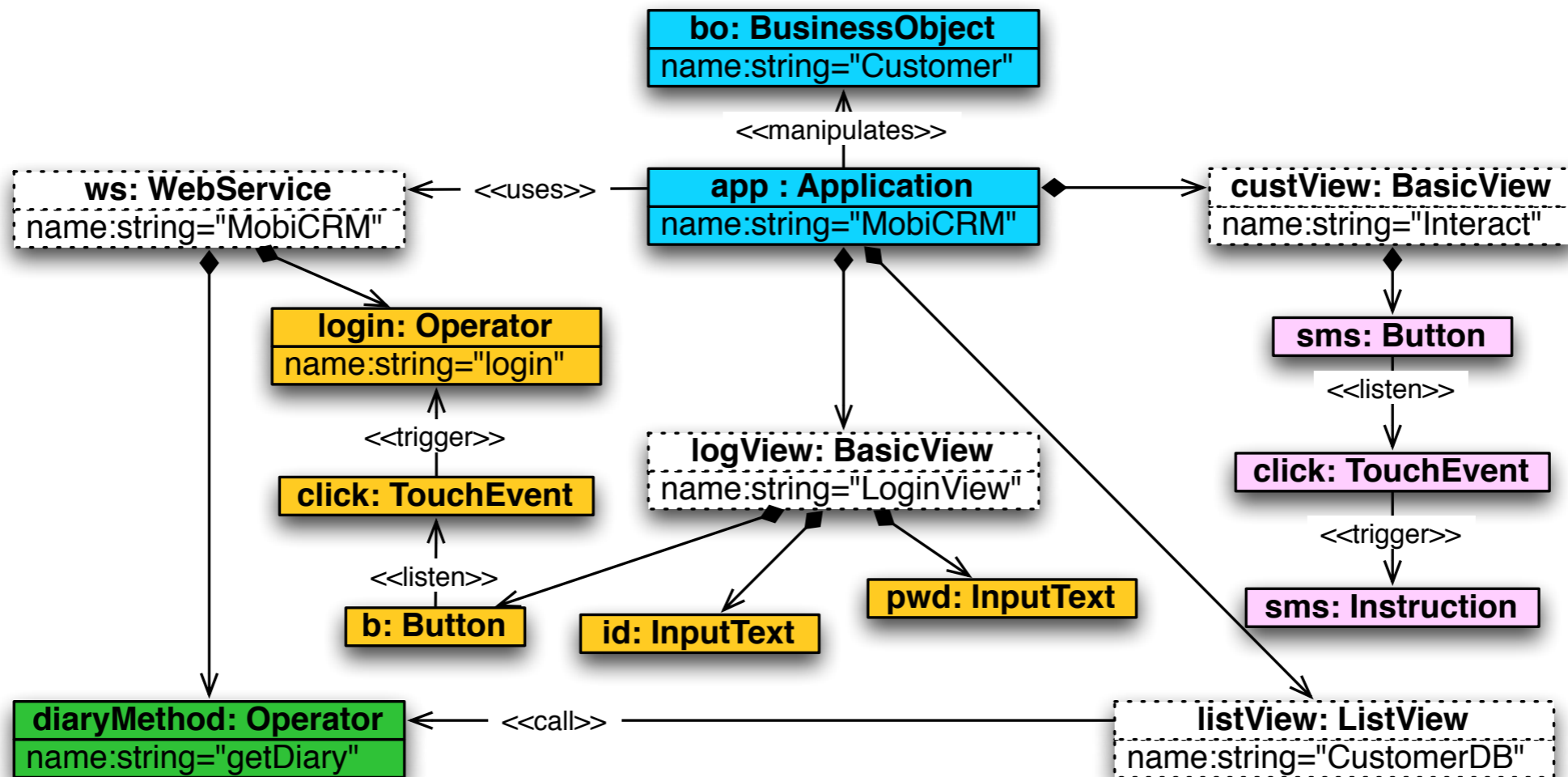
C₁: functional variability



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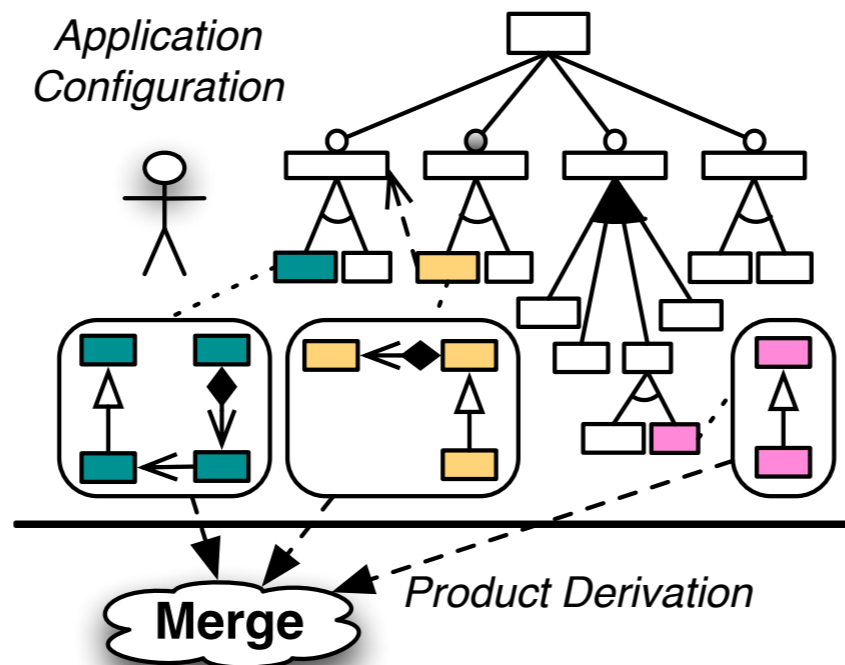
C₁: functional variability



The MobiCRM application model

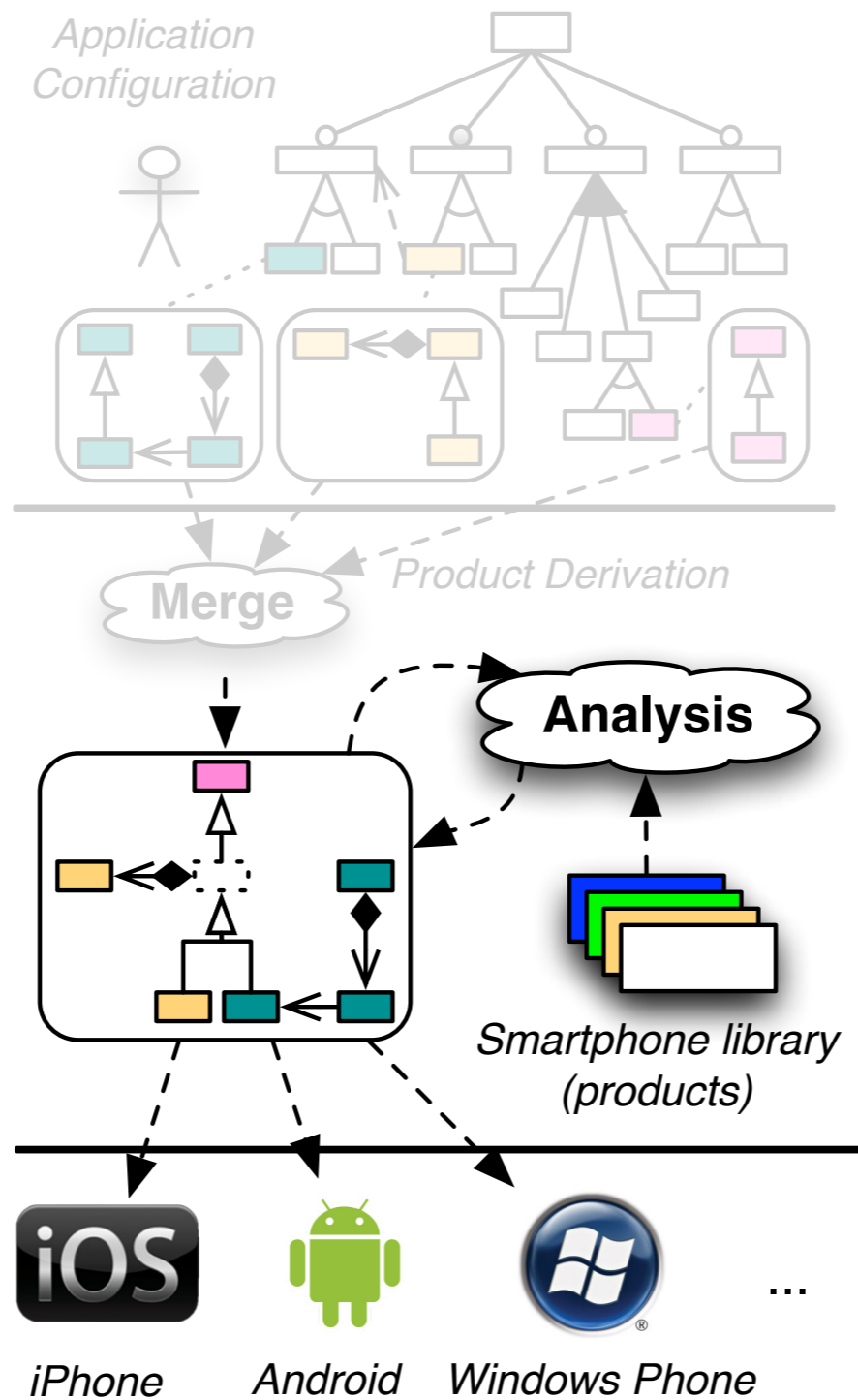
Our proposition: AppliDE

C_1 : functional variability



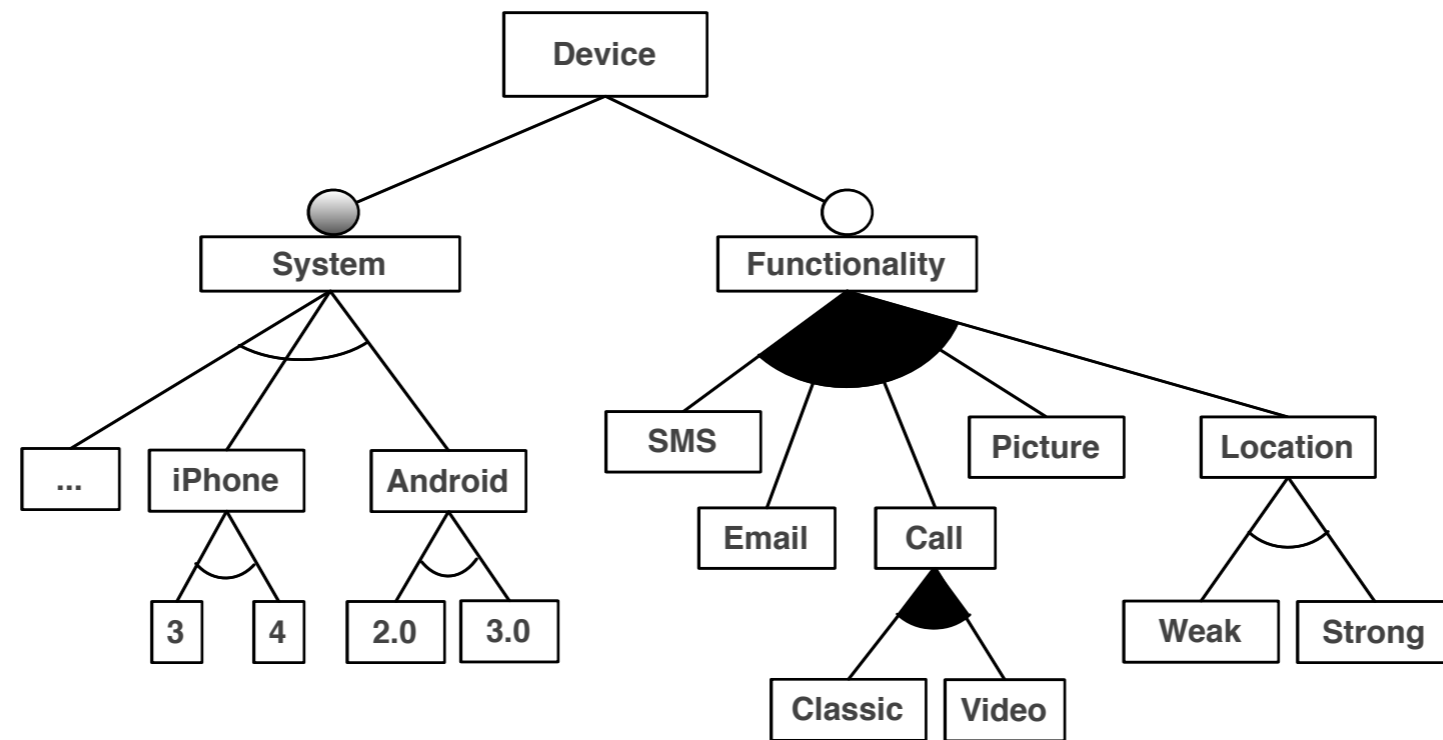
Our proposition: AppliDE

C_1 : functional variability

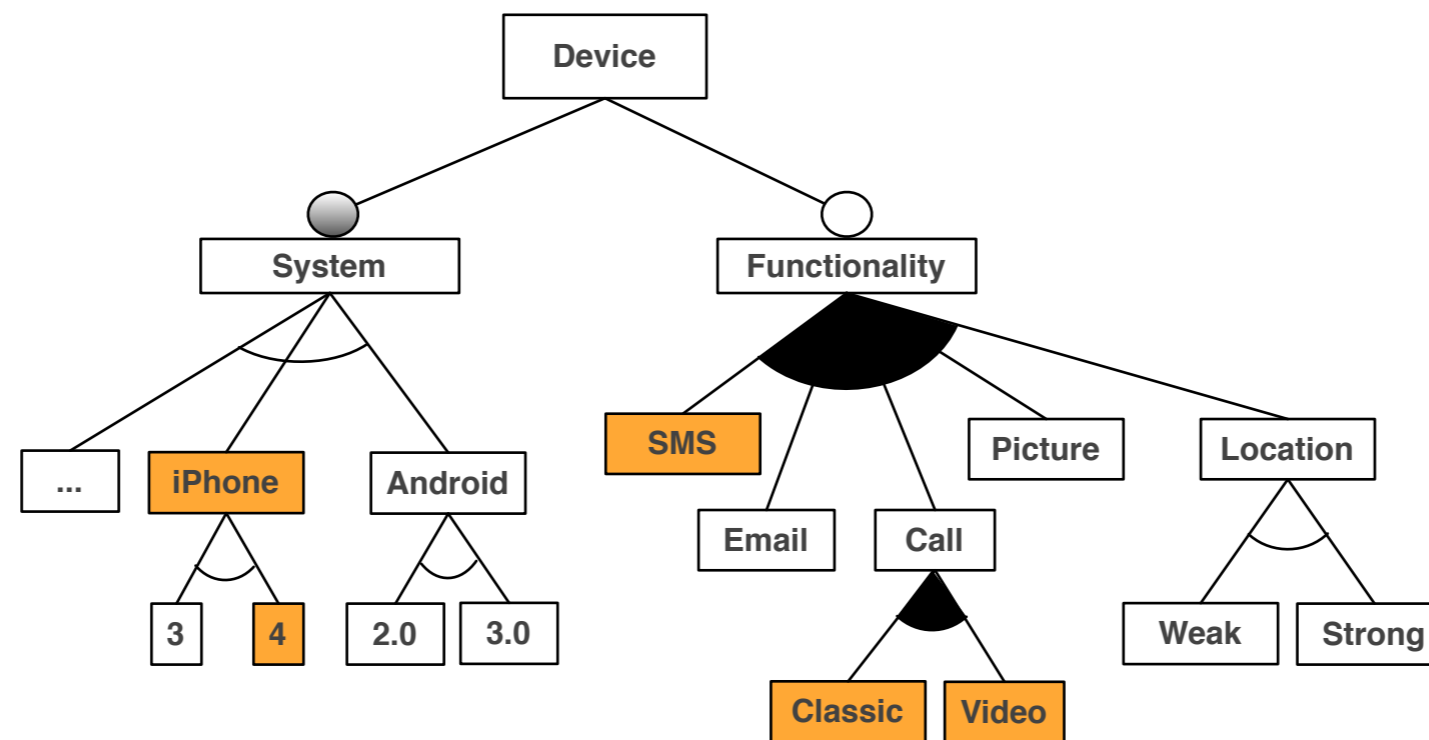


C_2 : device variability

C₂: device variability

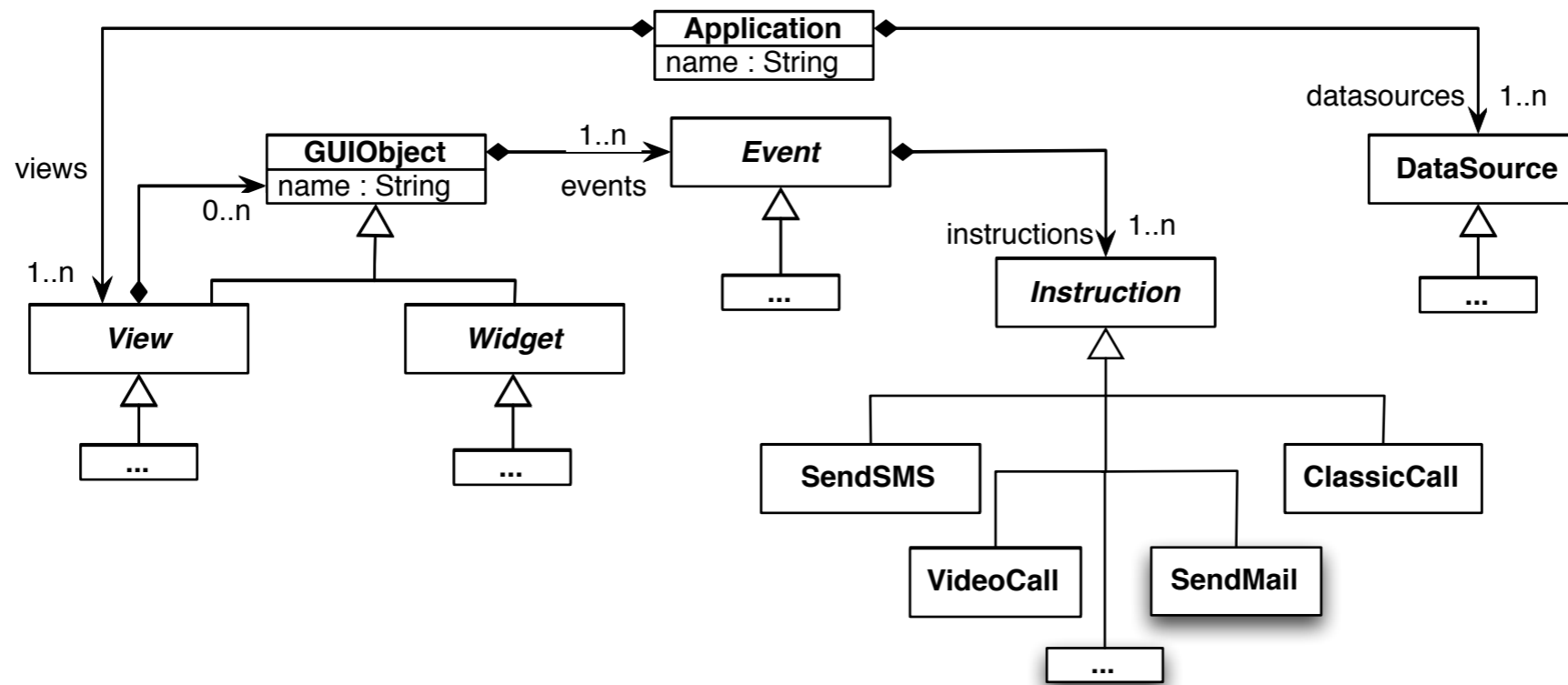


C₂: device variability

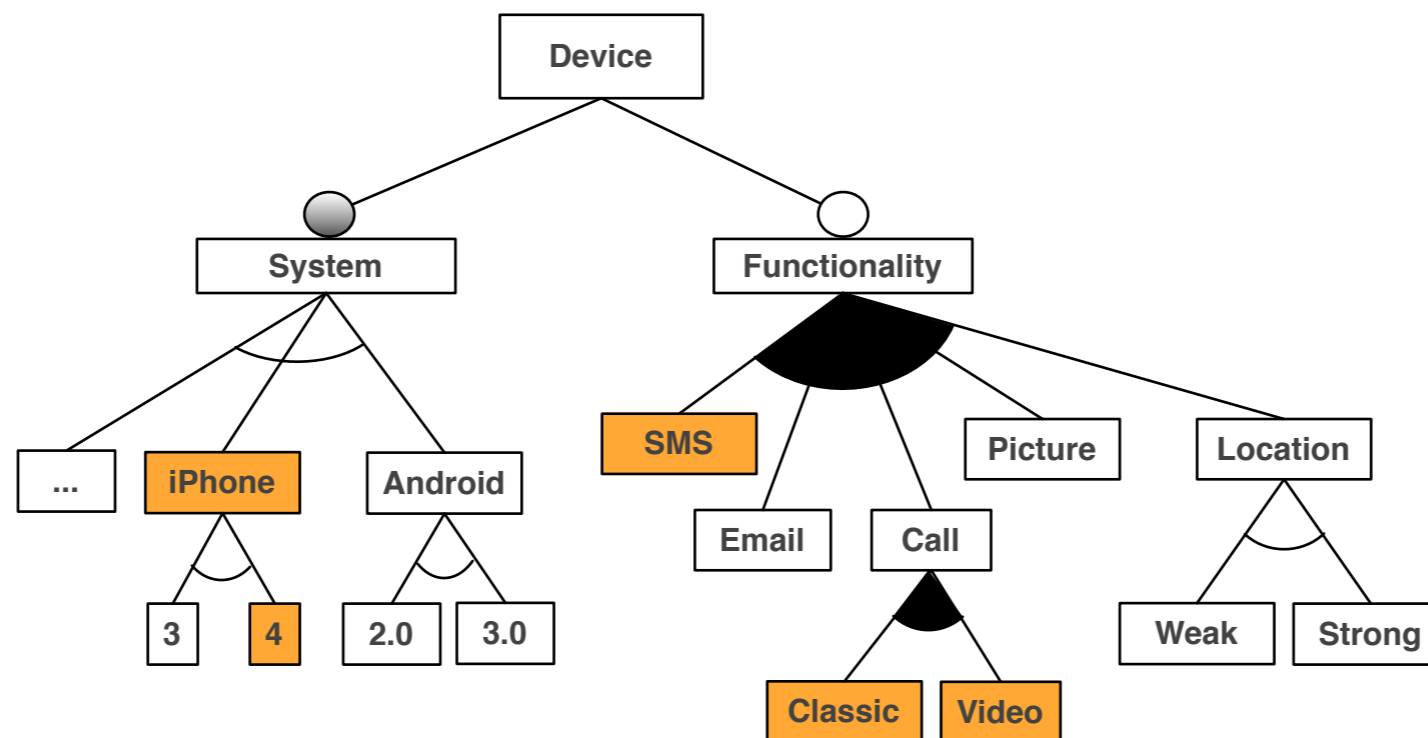


iPhone 4

C₂: device variability, meta-model pruning

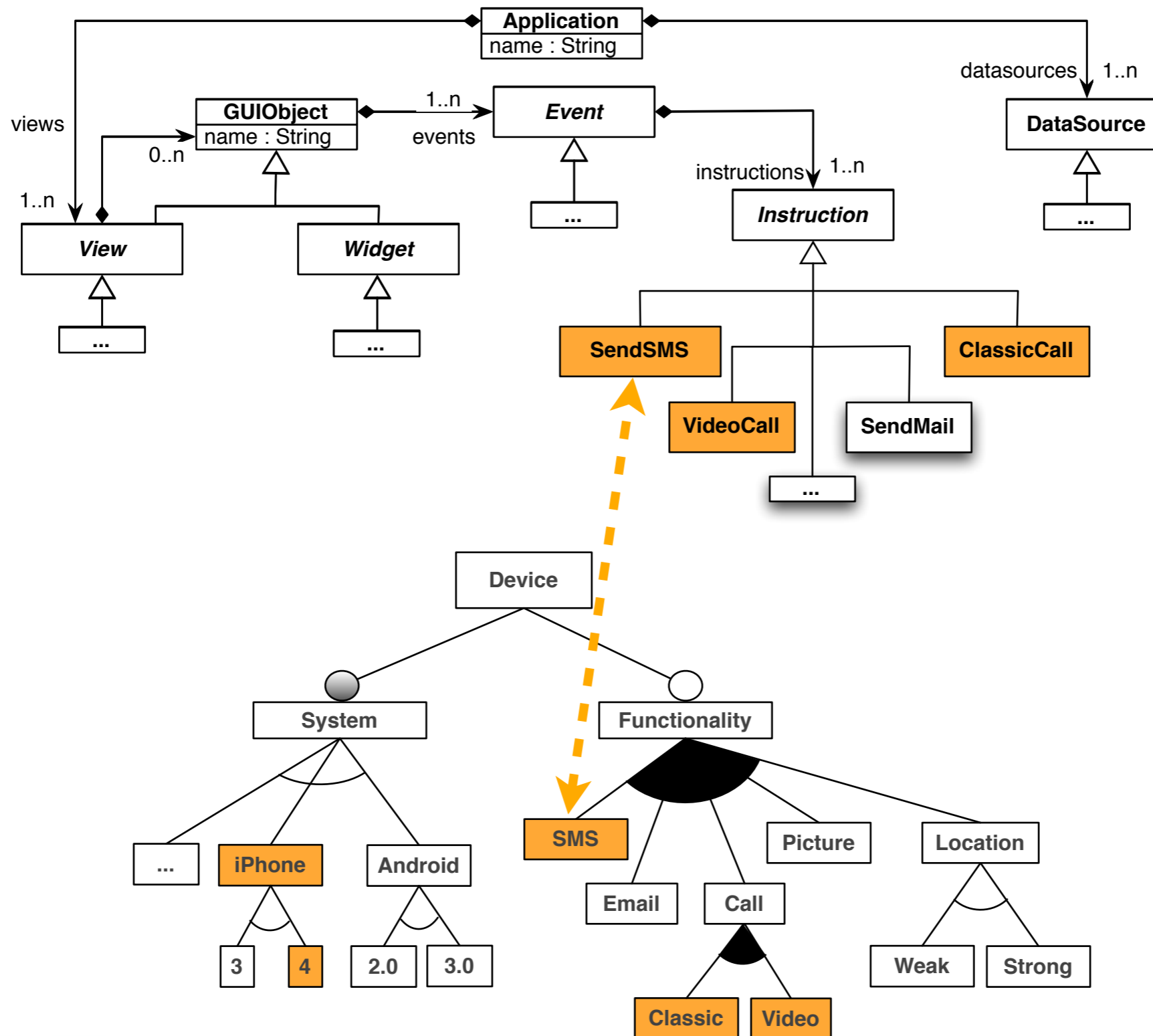


AppliDE meta-model



iPhone 4

C₂: device variability, meta-model pruning

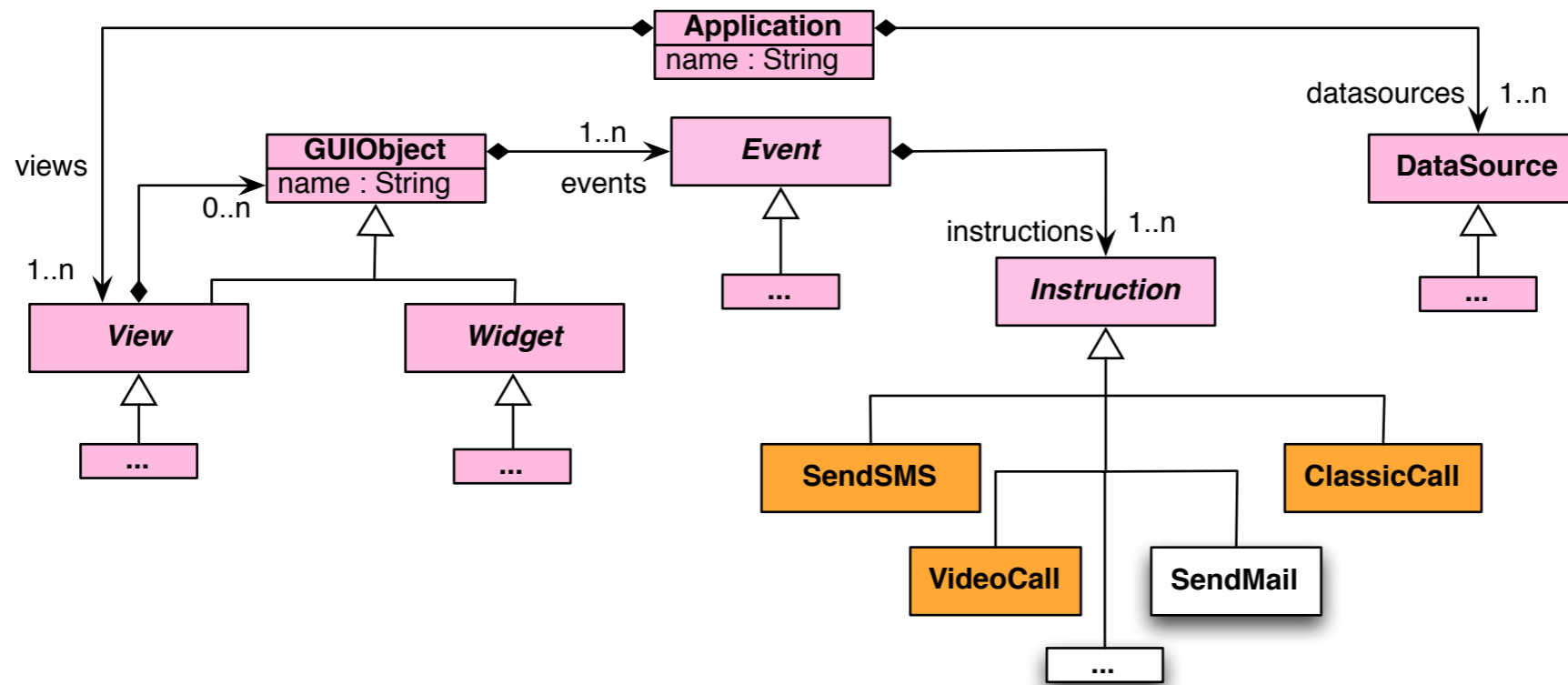


AppliDE meta-model

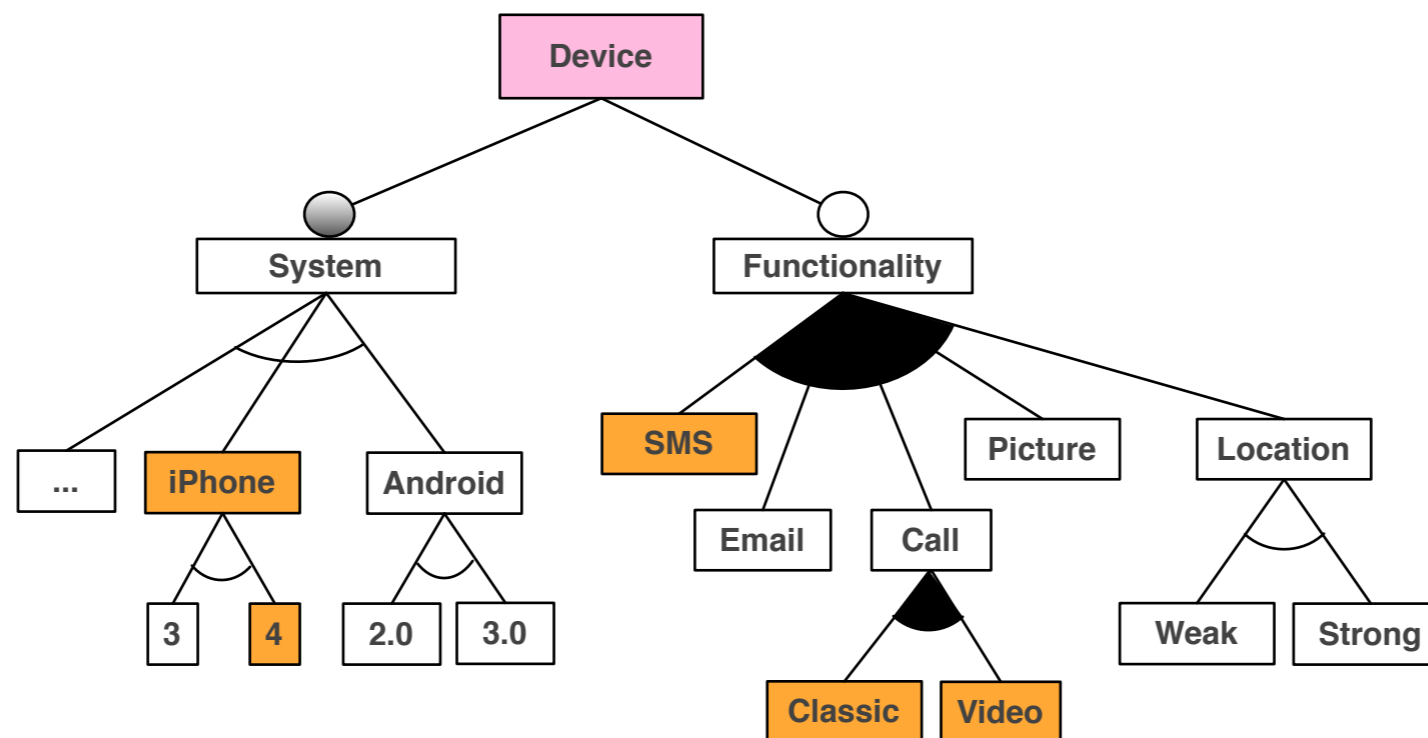


iPhone 4

C₂: device variability, meta-model pruning

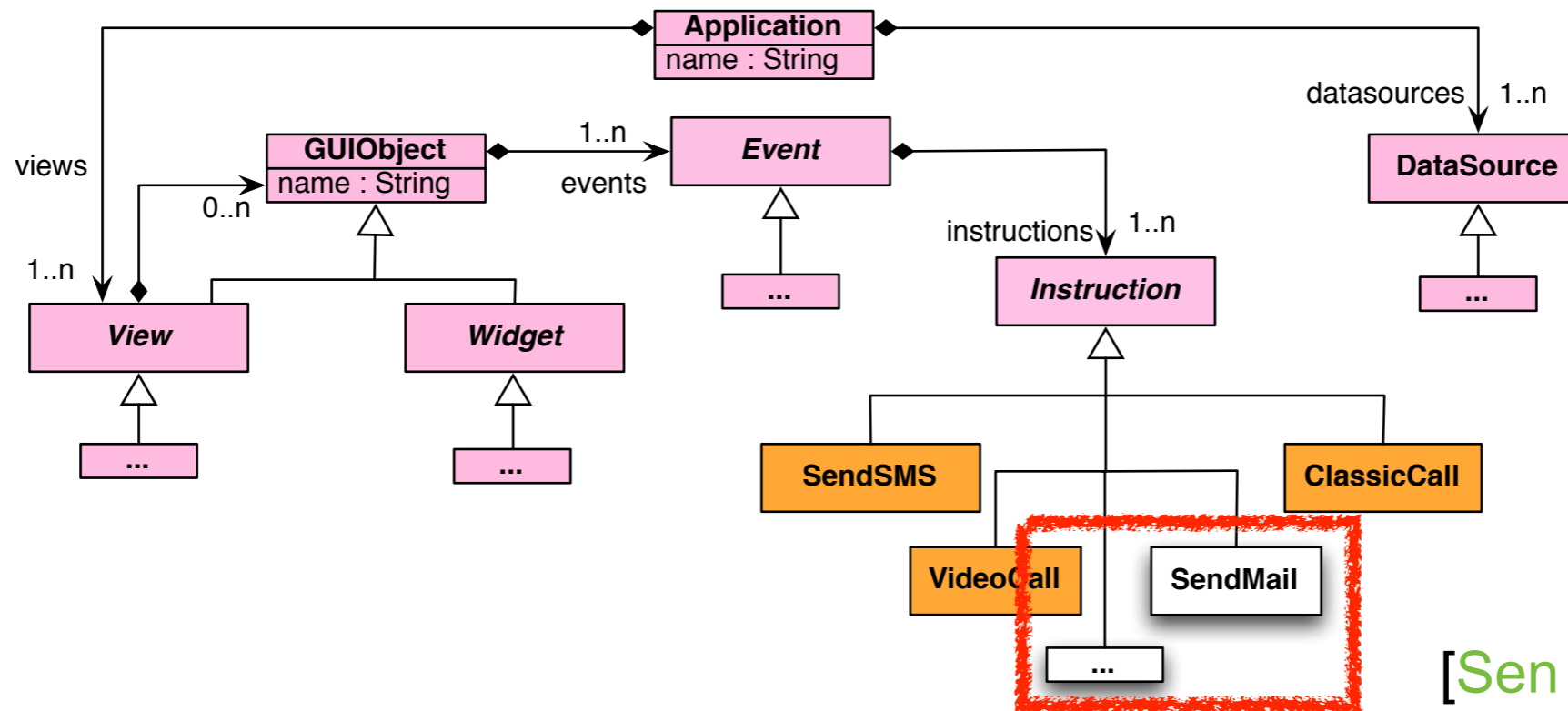


AppliDE meta-model



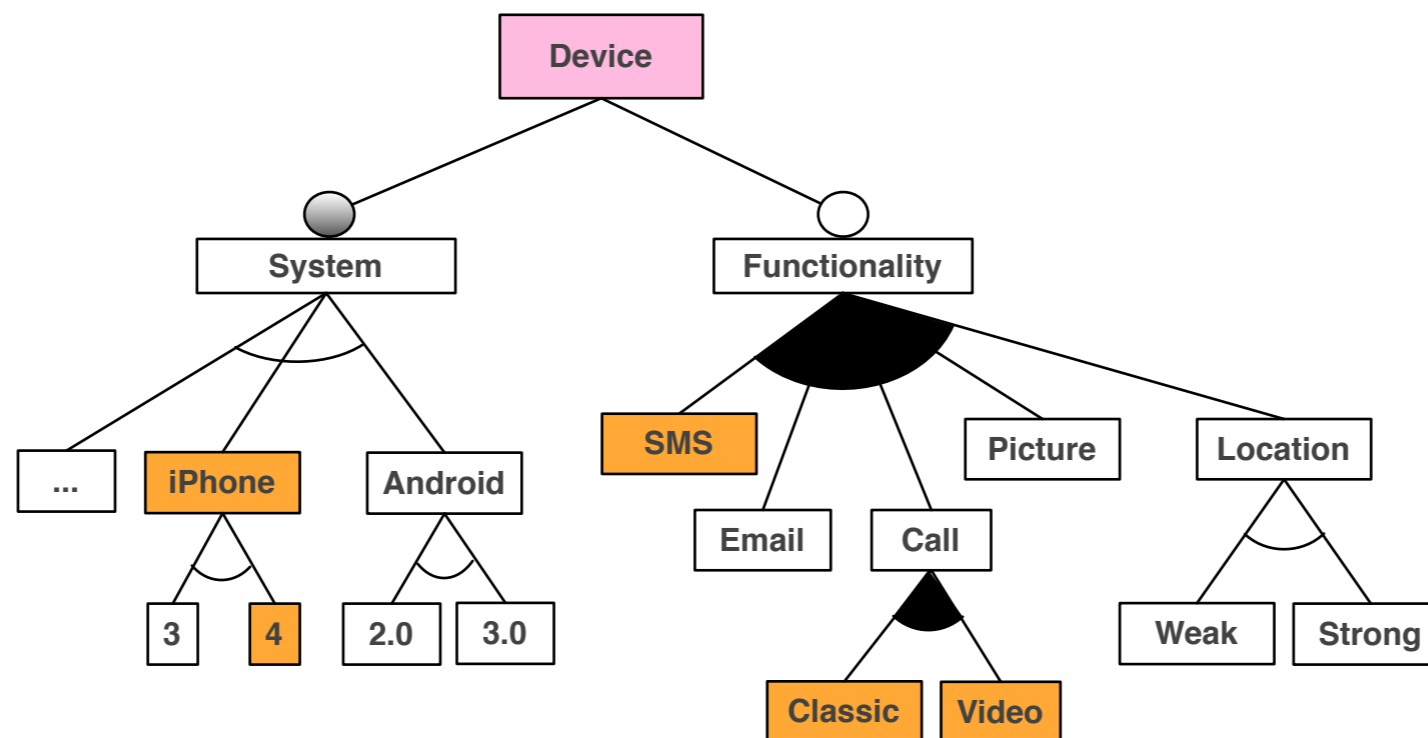
iPhone 4

C₂: device variability, meta-model pruning



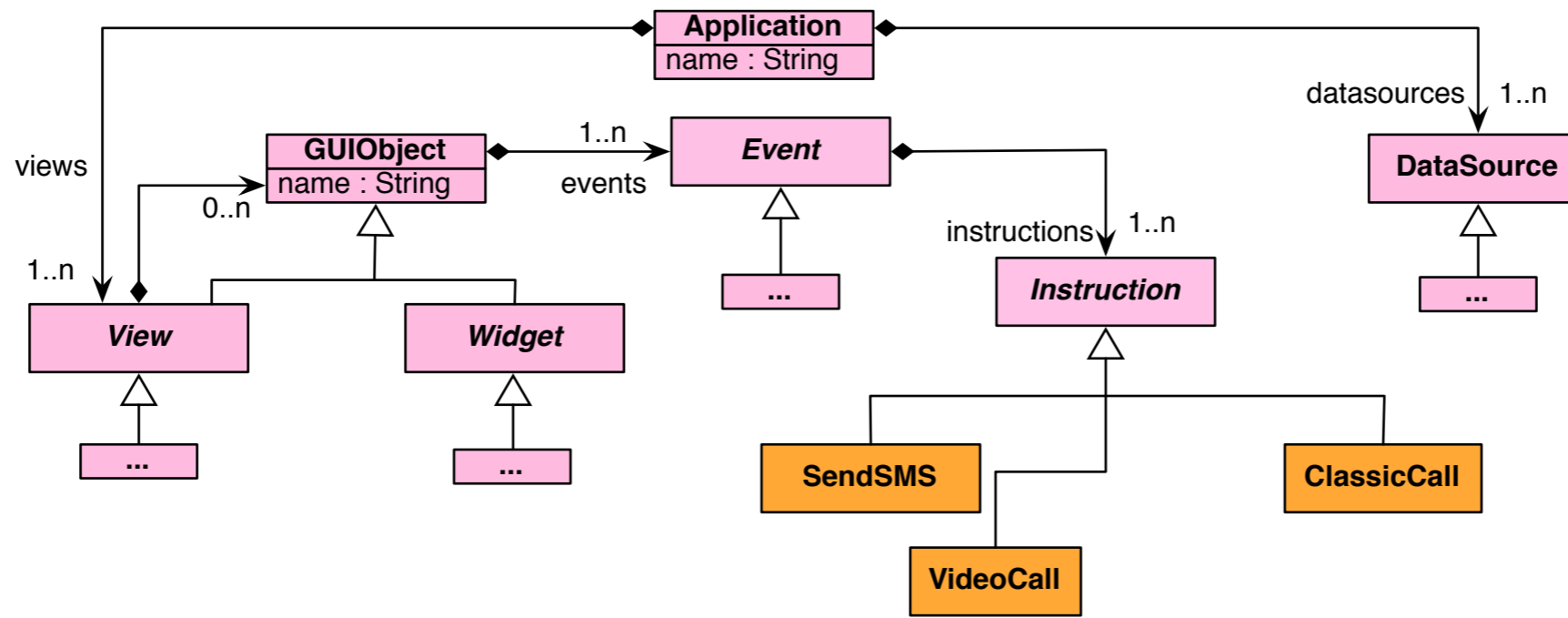
AppliDE meta-model

[Sen et al. MODELS'09]



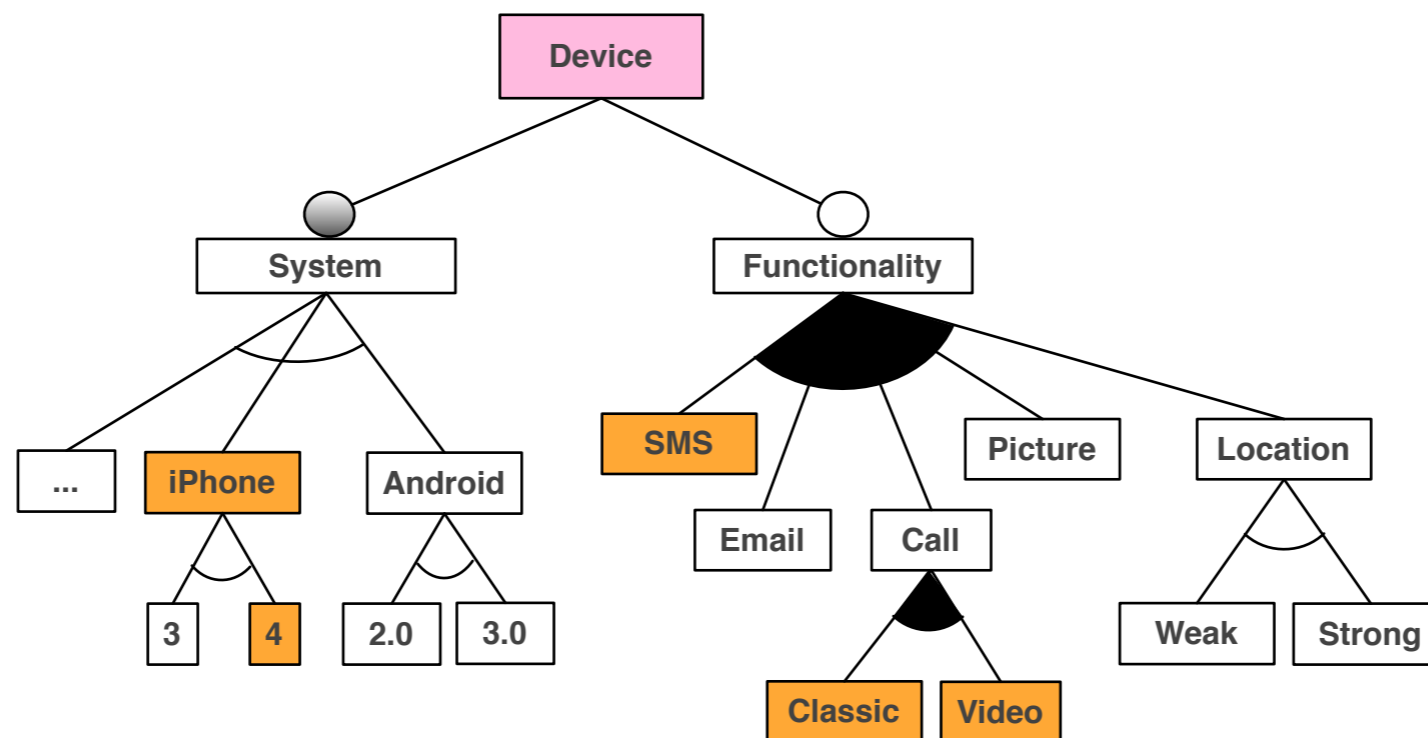
iPhone 4

C₂: device variability, meta-model pruning



AppliDE meta-model

[Sen et al. MODELS'09]

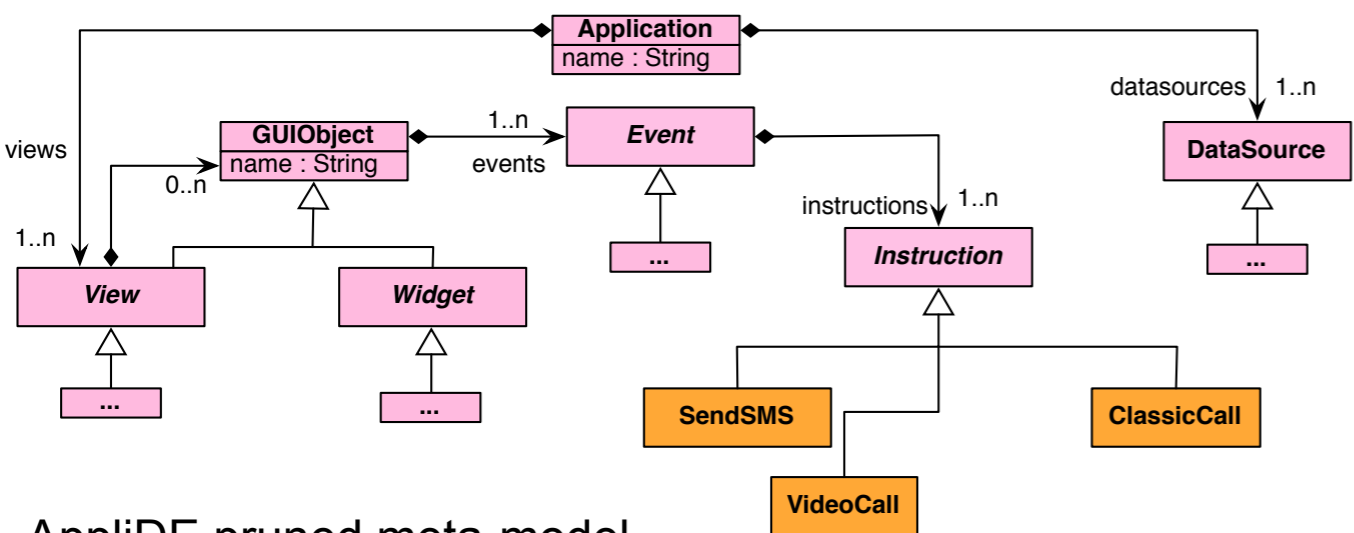


iPhone 4

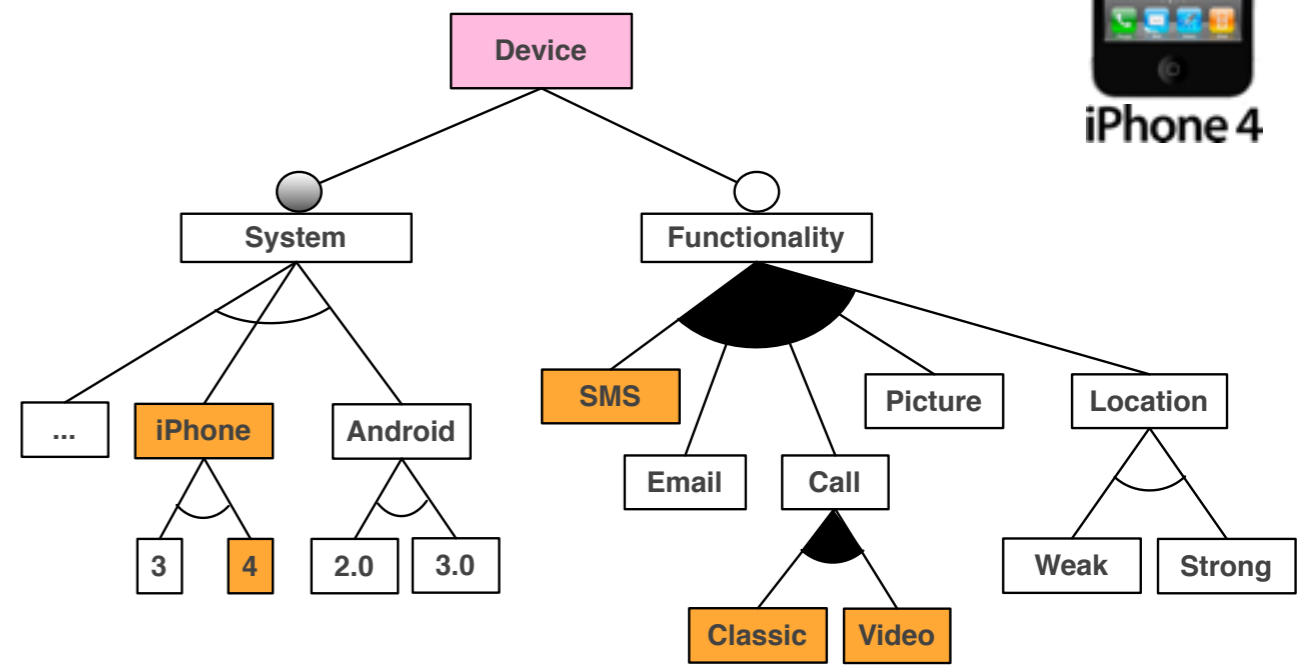
C₂: device variability



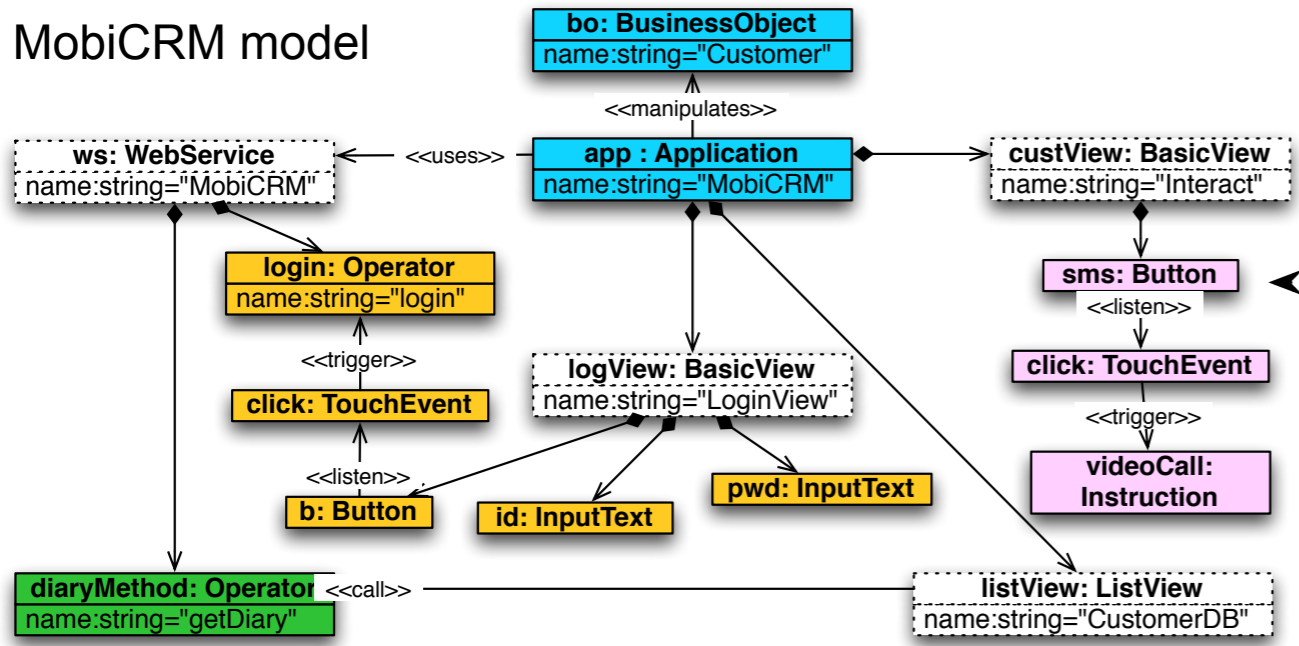
iPhone 4



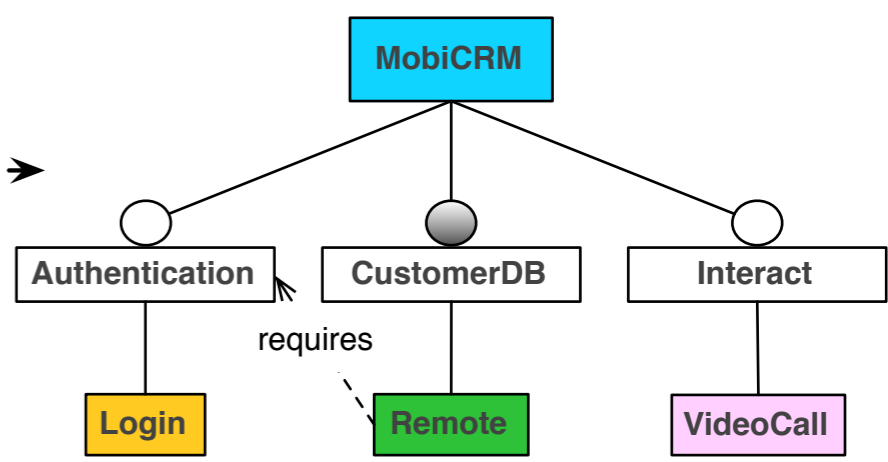
AppliDE pruned meta-model



MobiCRM model



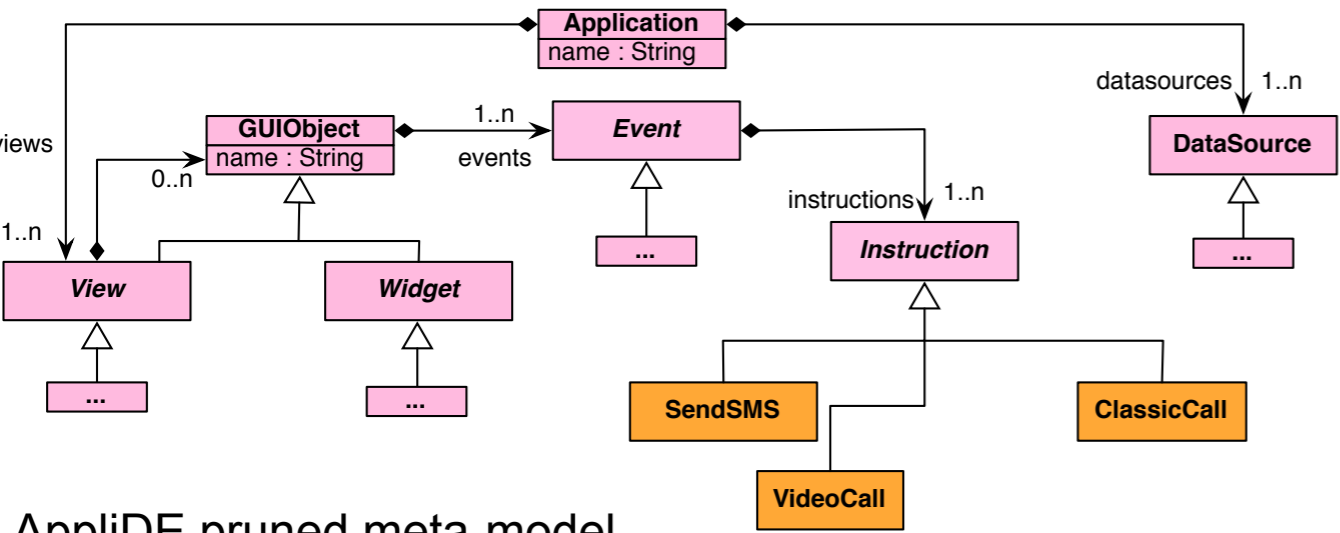
MobiCRM feature model



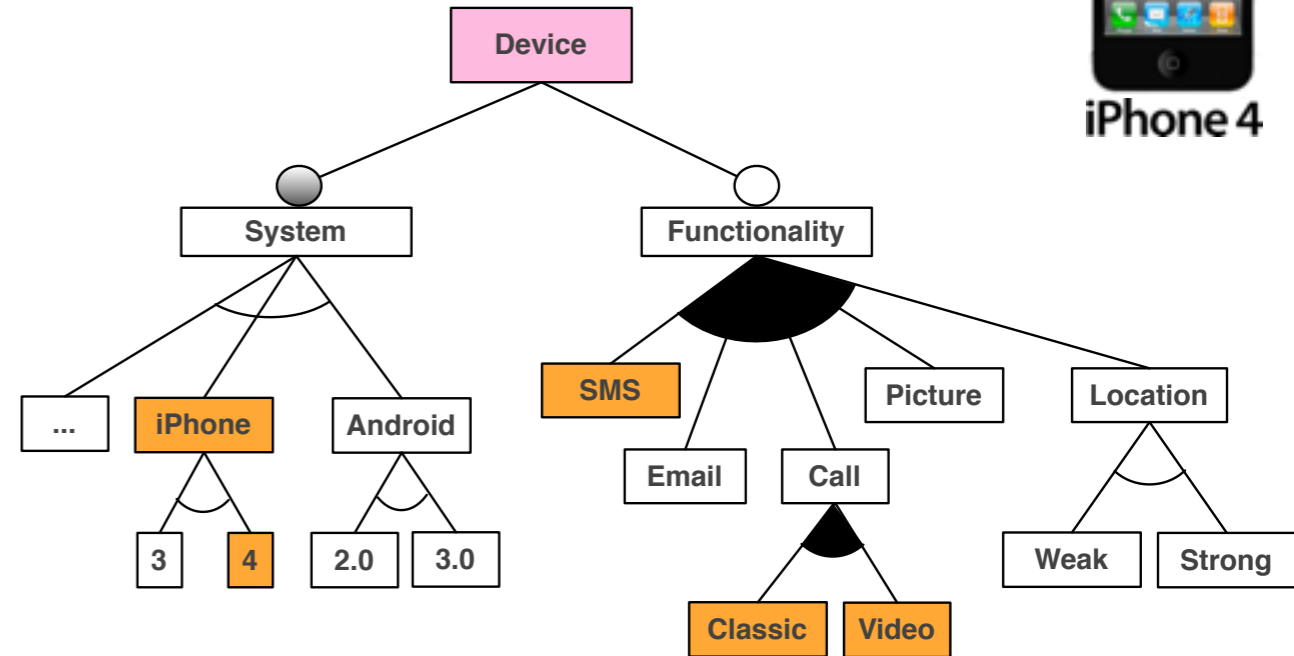
associated to



C₂: device variability



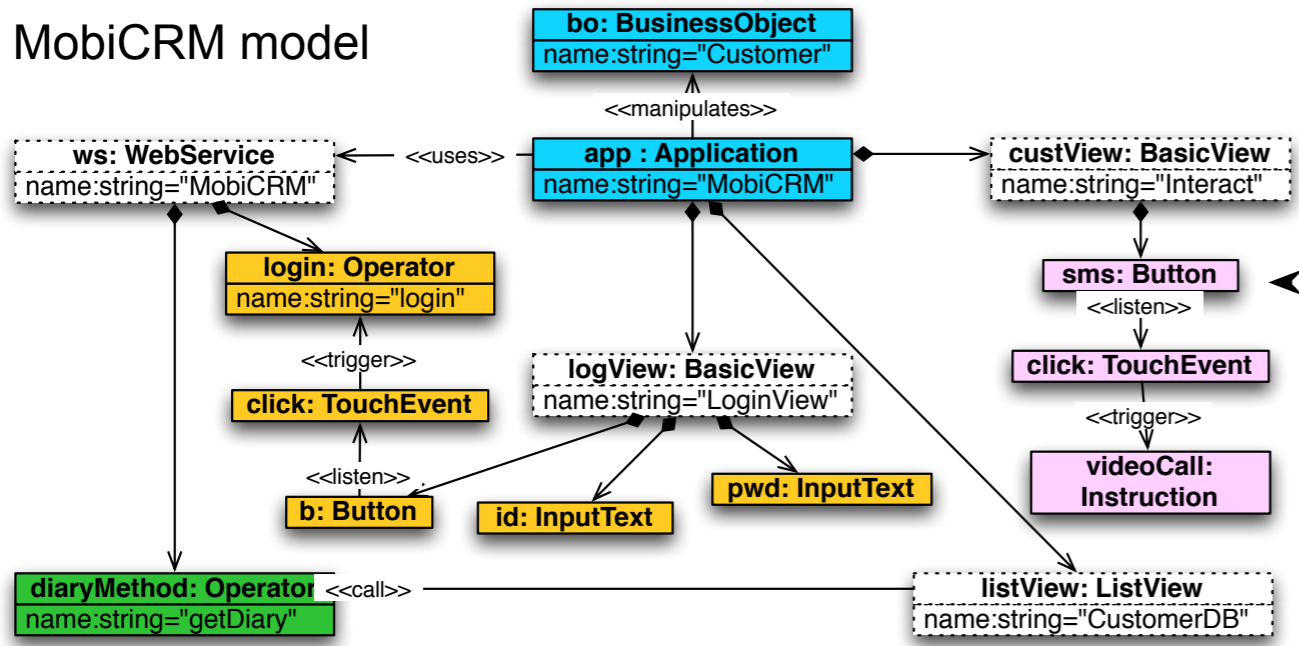
AppliDE pruned meta-model



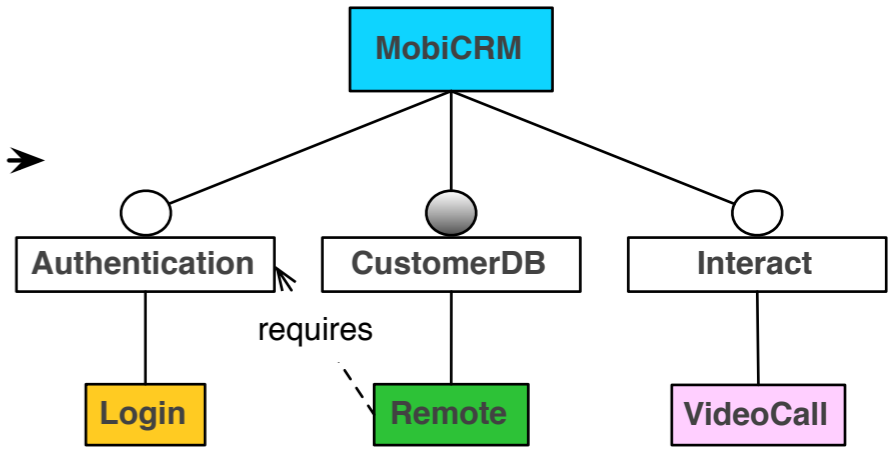
conforms to

can be executed on

MobiCRM model



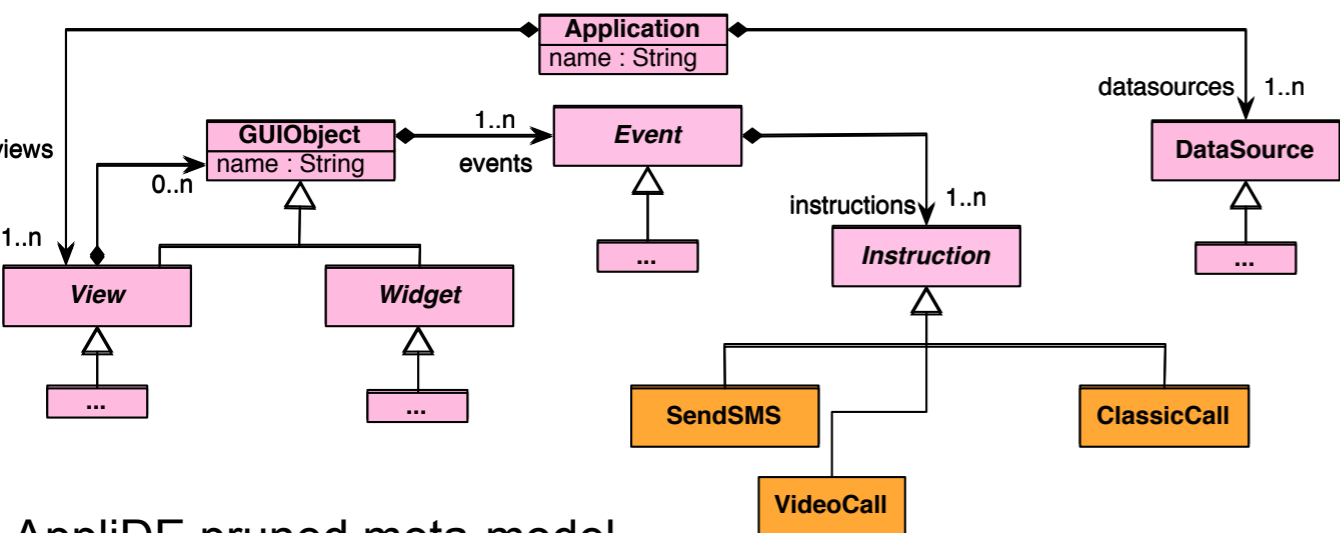
MobiCRM feature model



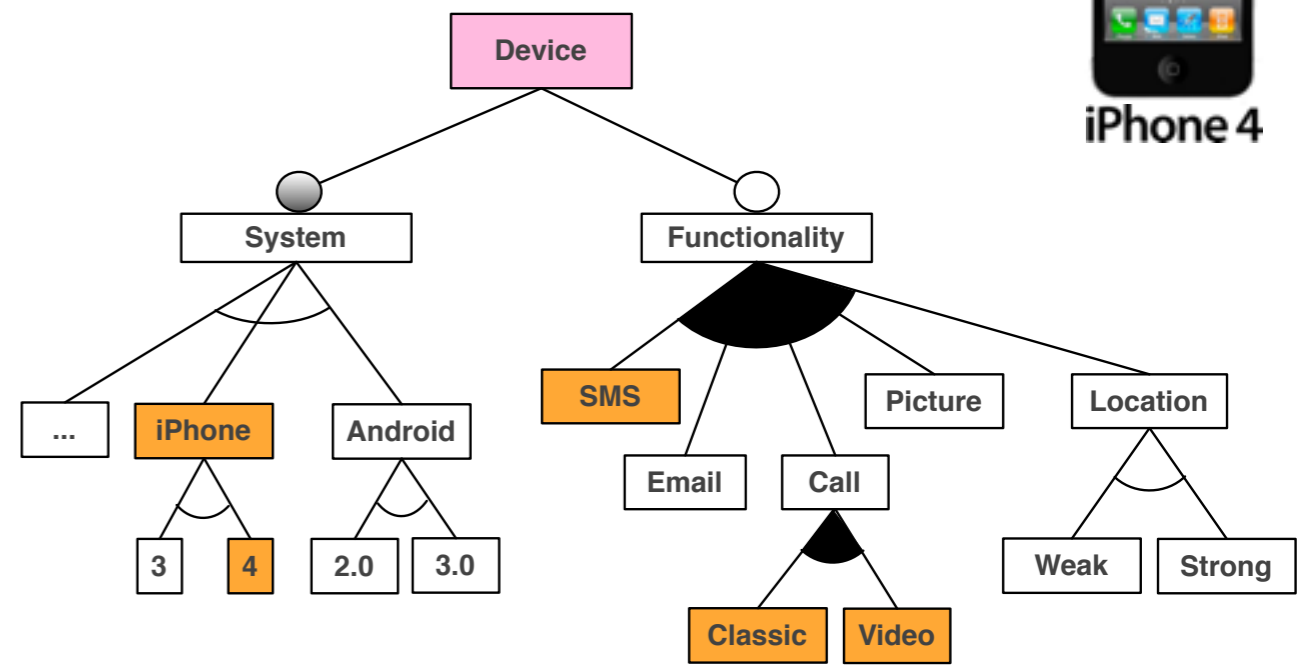
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C₂: device variability



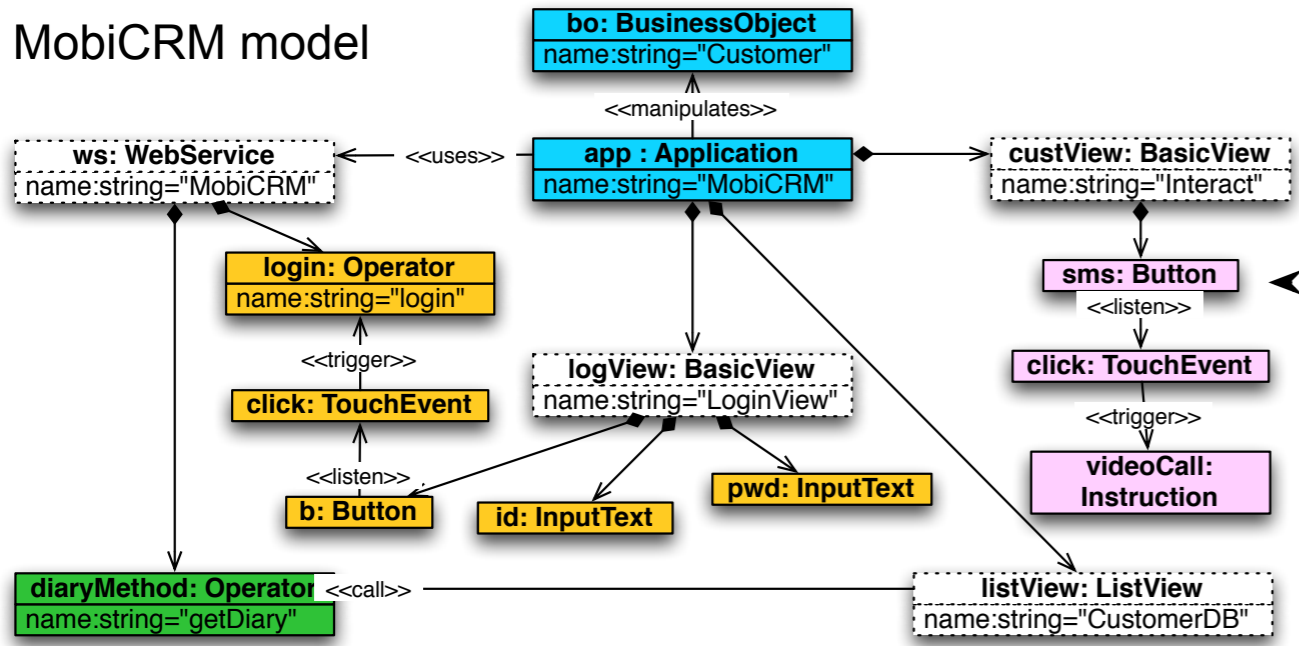
AppliDE pruned meta-model



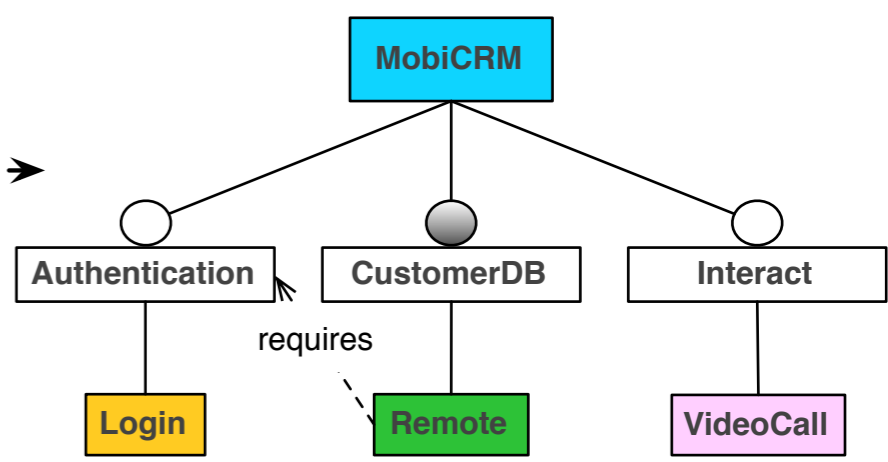
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MobiCRM model



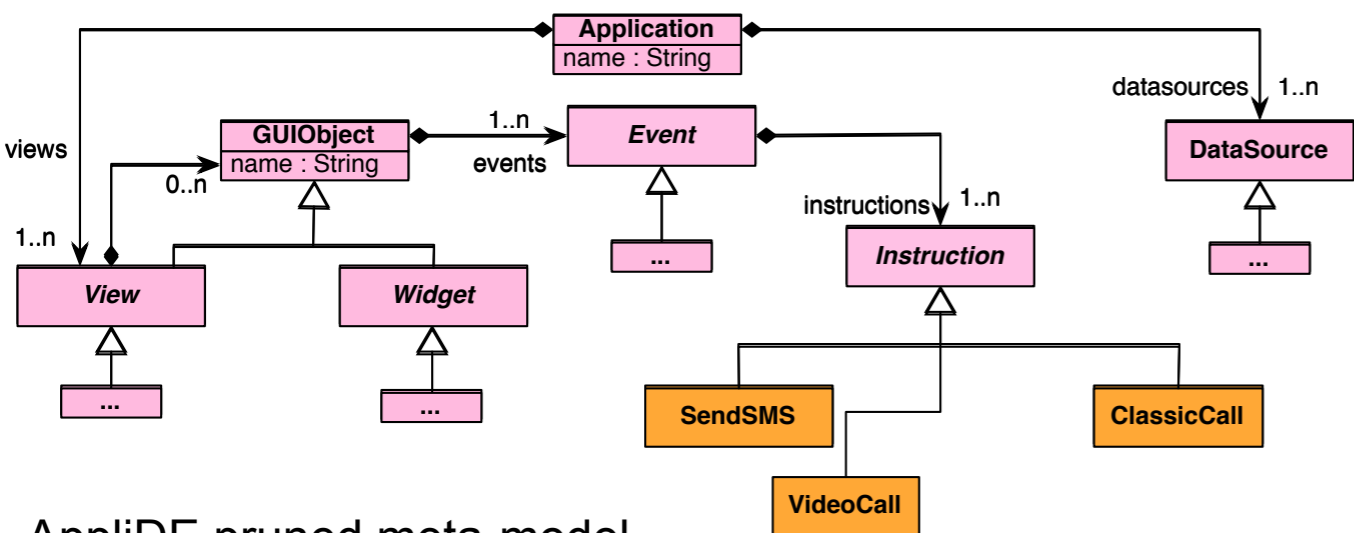
MobiCRM feature model



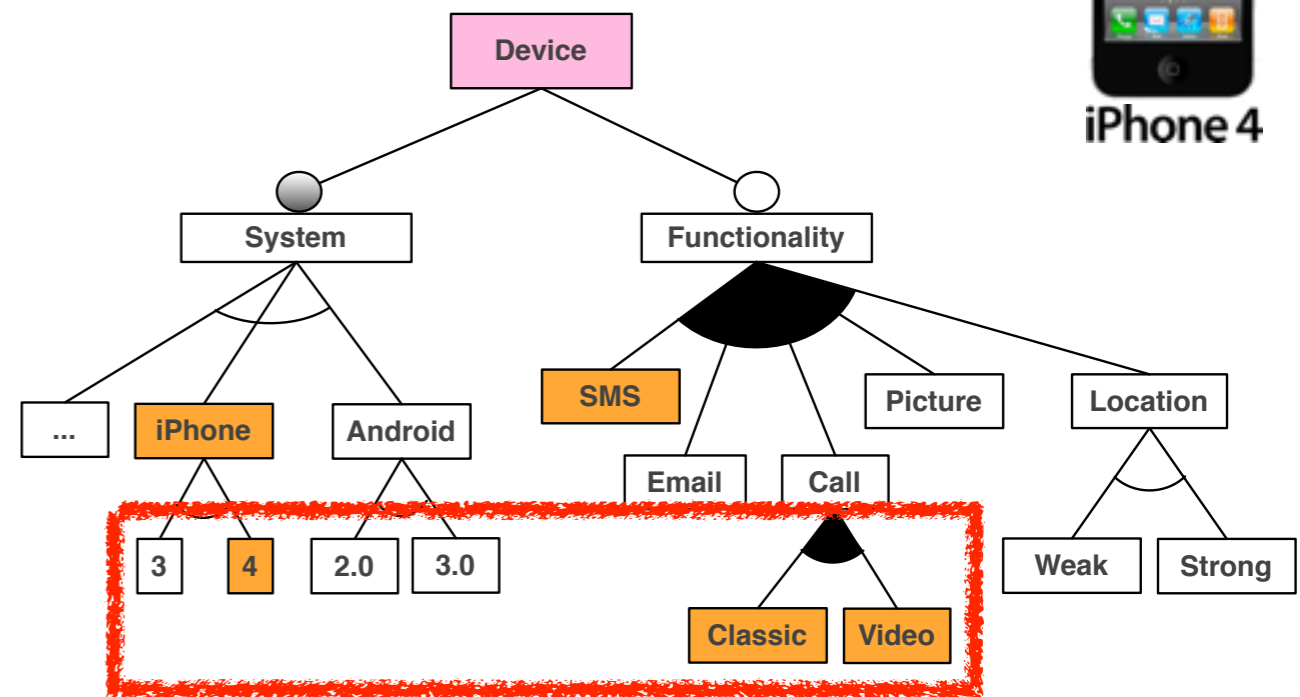
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C₂: device variability



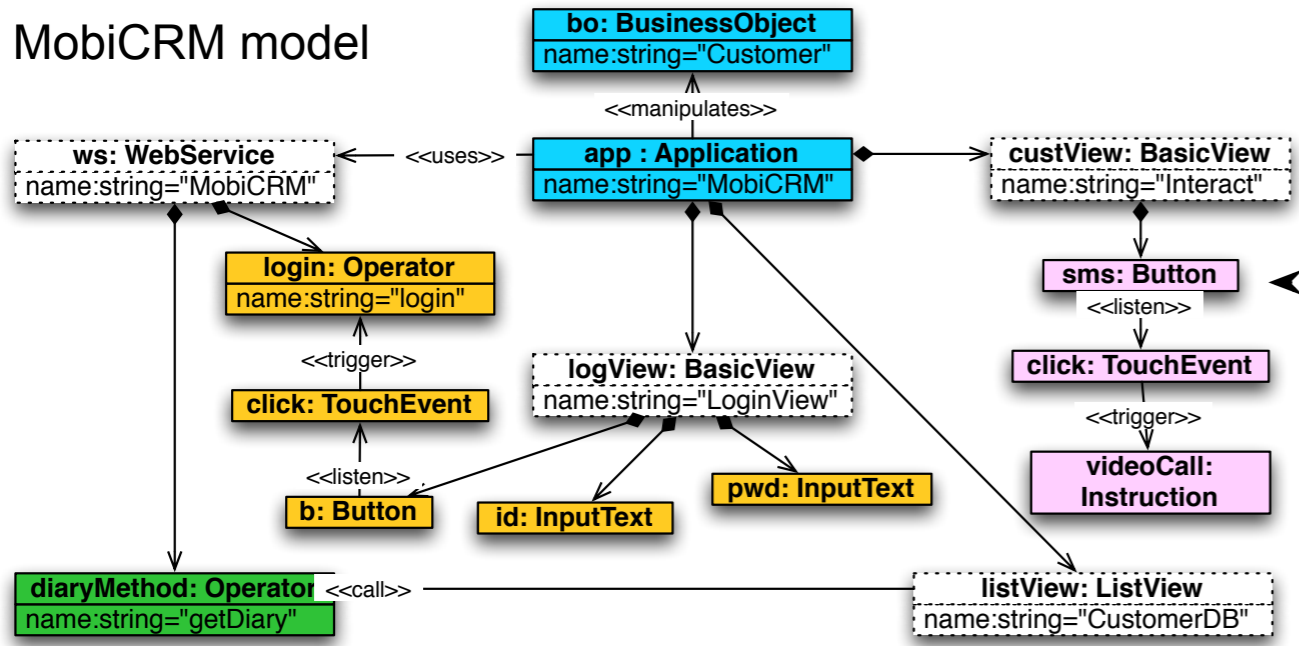
AppliDE pruned meta-model



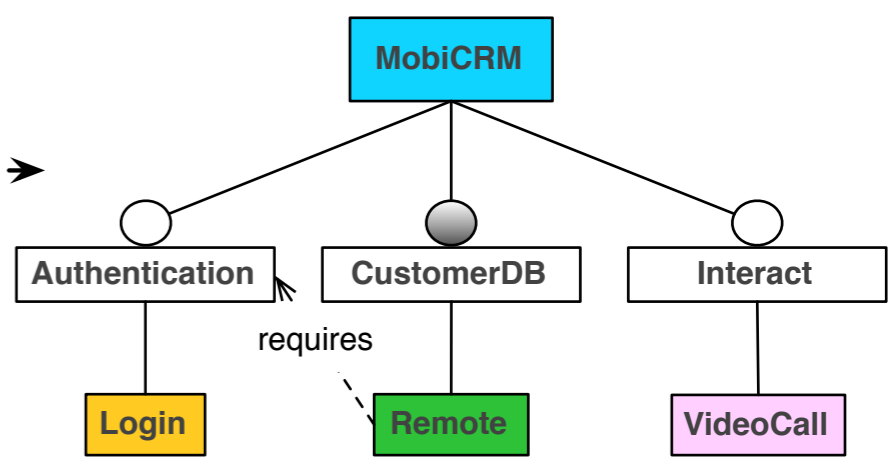
conforms to

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MobiCRM model



MobiCRM feature model



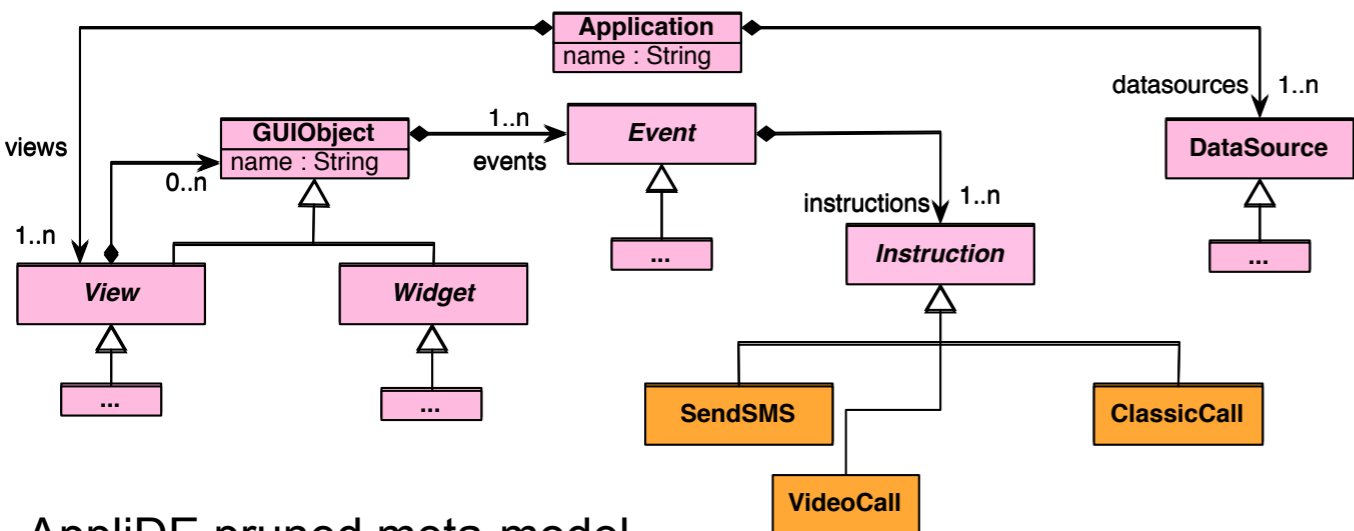
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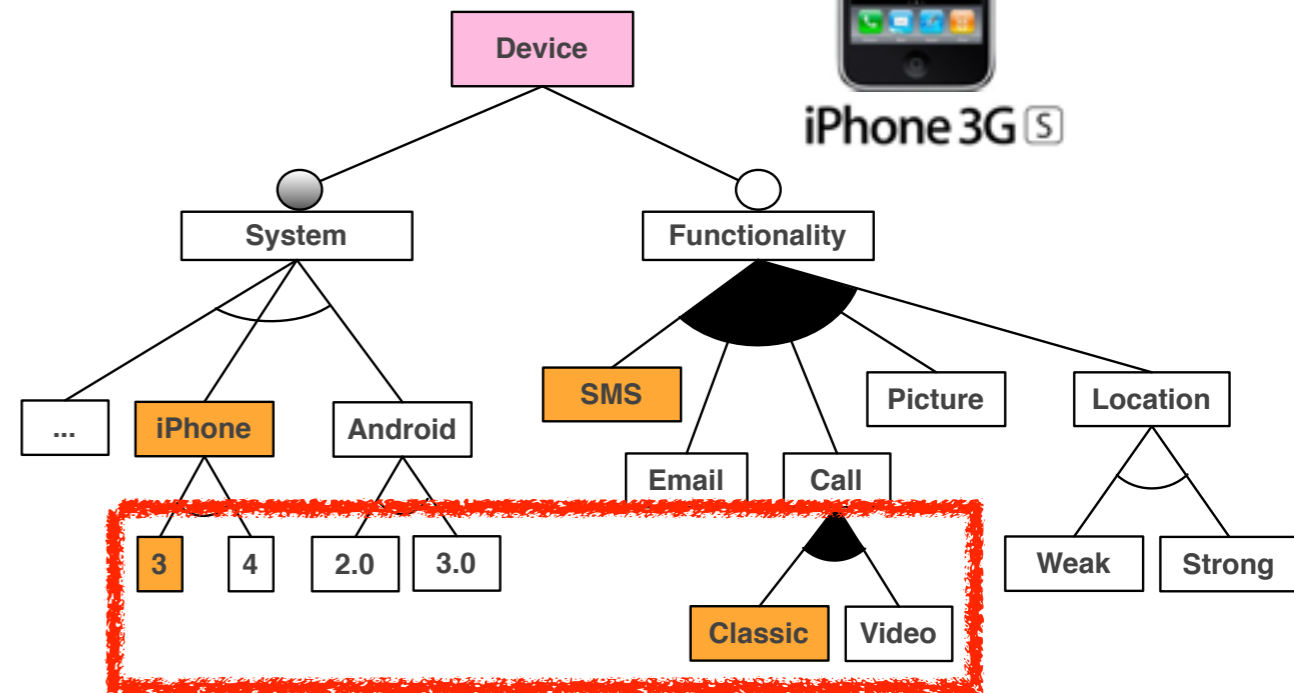
C₂: device variability



iPhone 3G S



AppliDE pruned meta-model



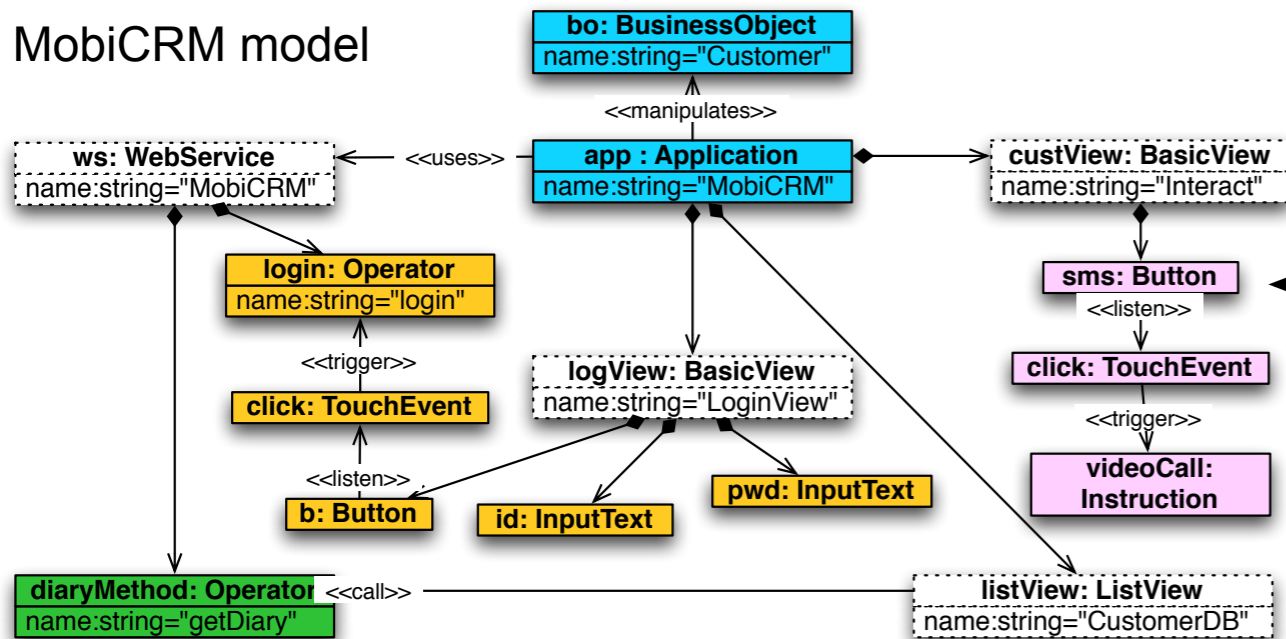
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can be executed on



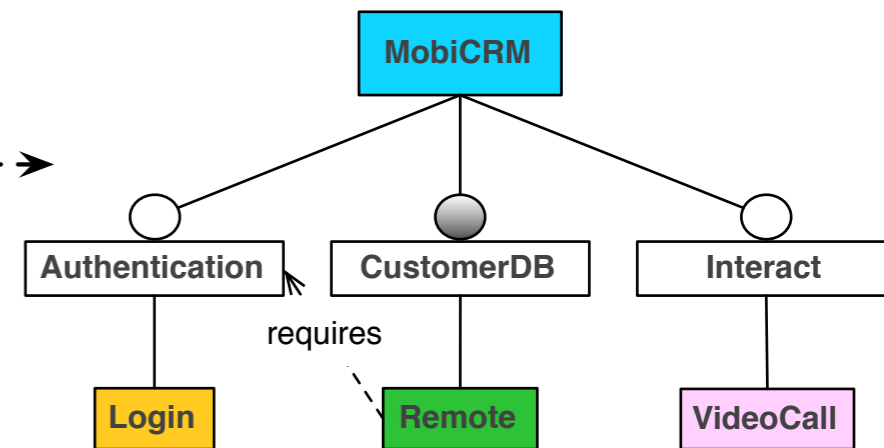
MobiCRM model



associated to



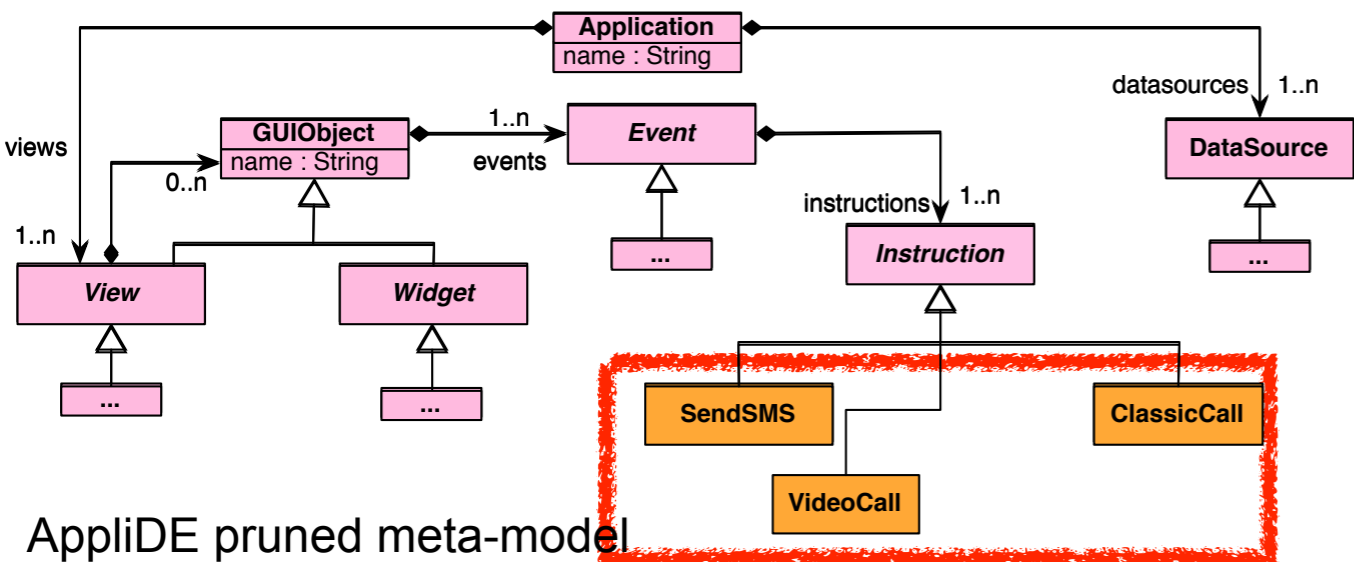
MobiCRM feature model



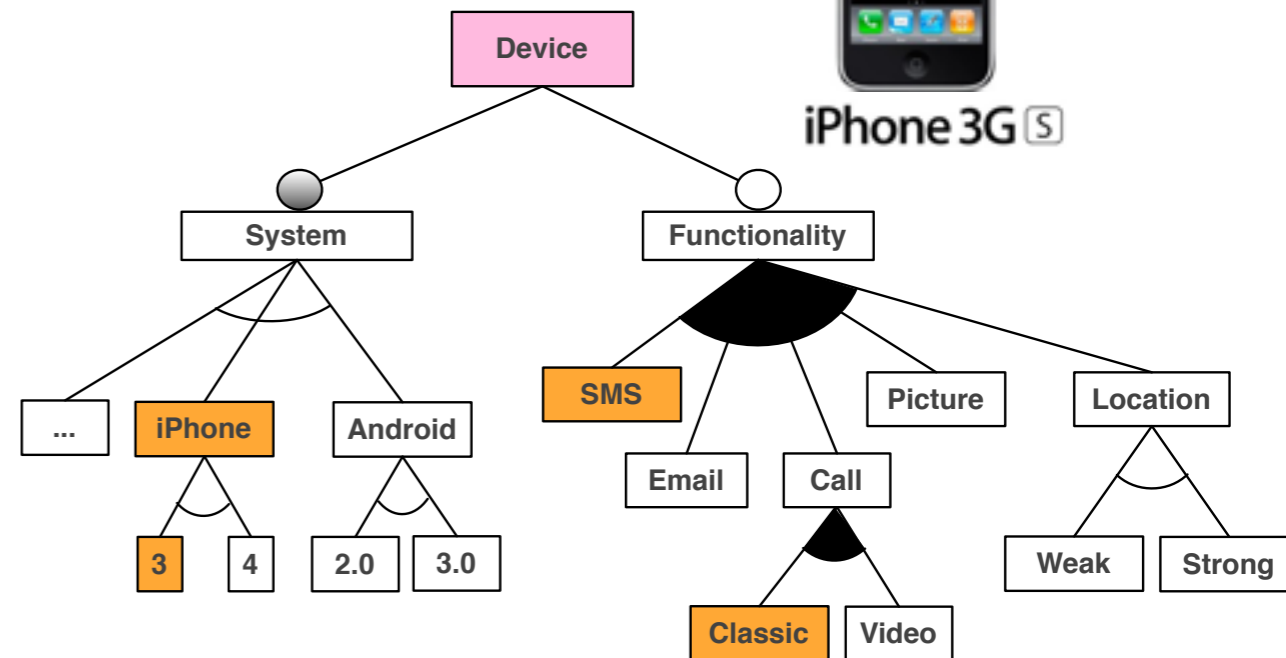
C₂: device variability



iPhone 3G S



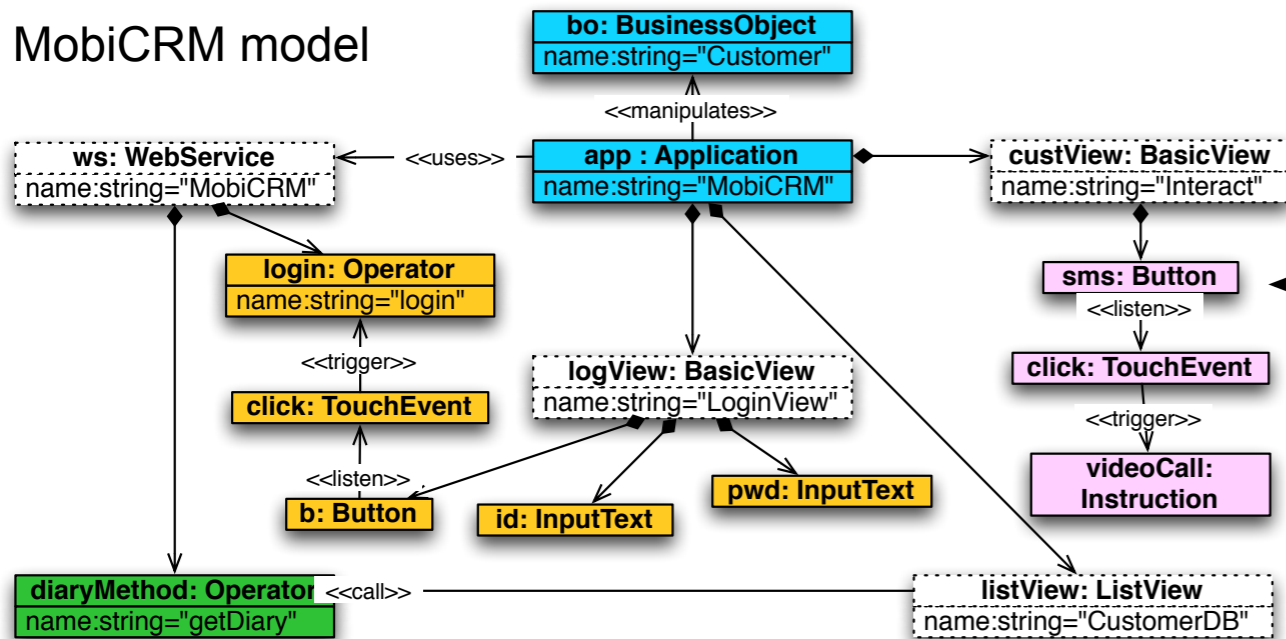
AppliDE pruned meta-model



conforms to

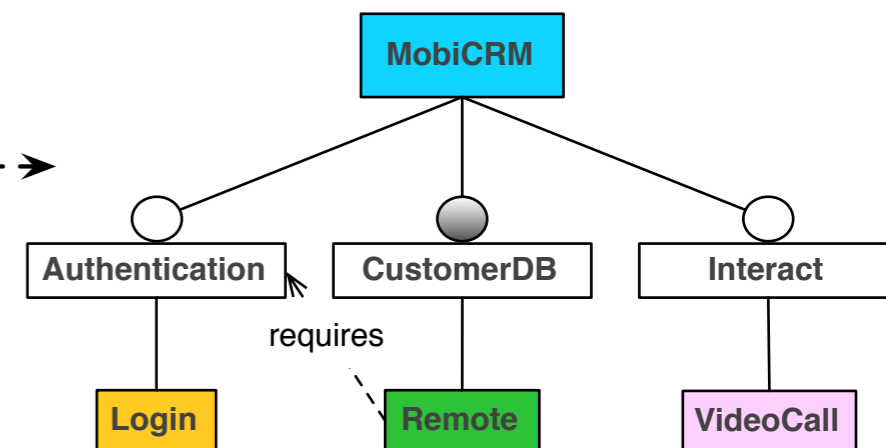
can be executed on

MobiCRM model



associated to

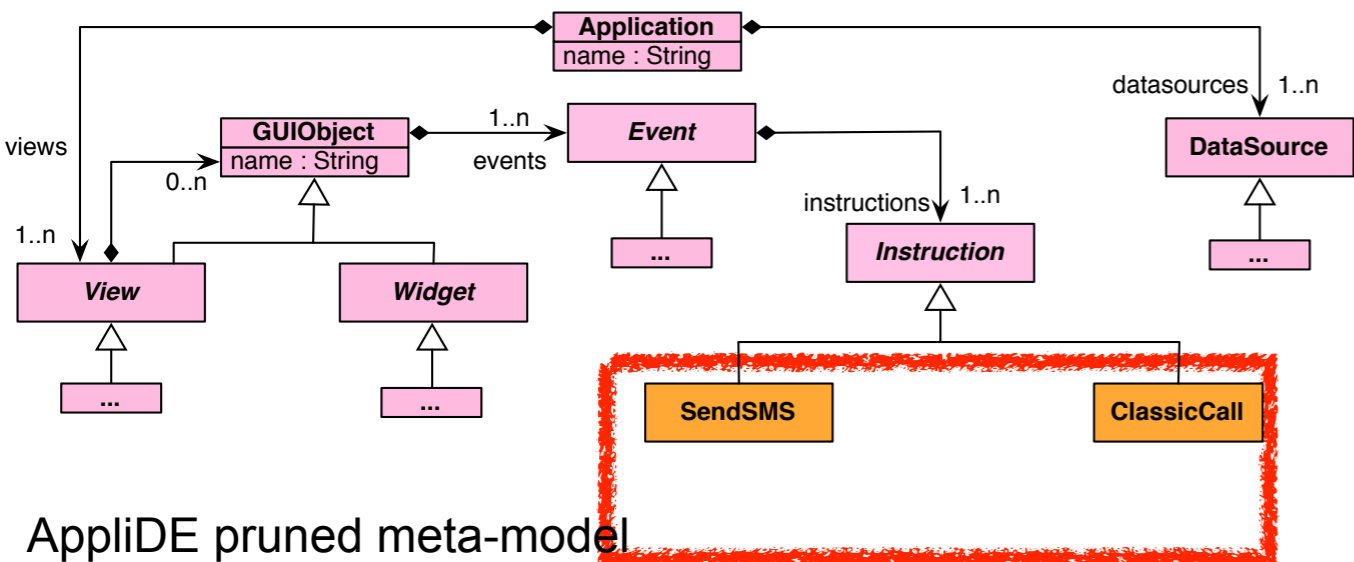
MobiCRM feature model



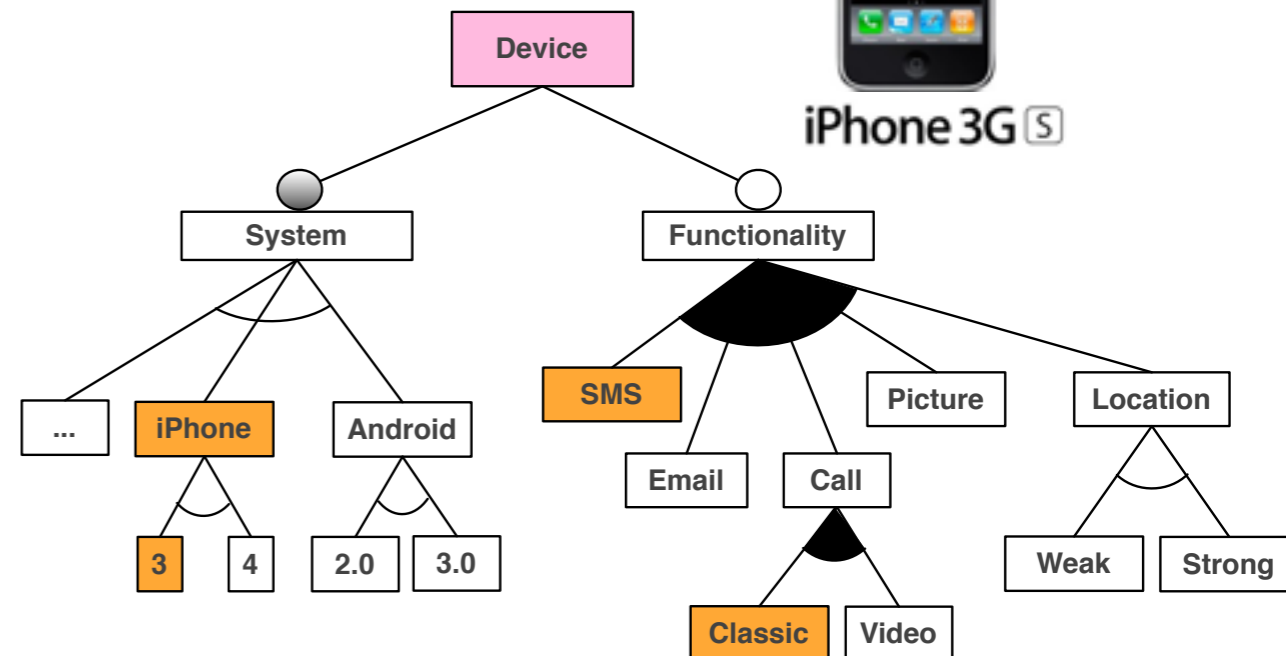
C₂: device variability



iPhone 3G S



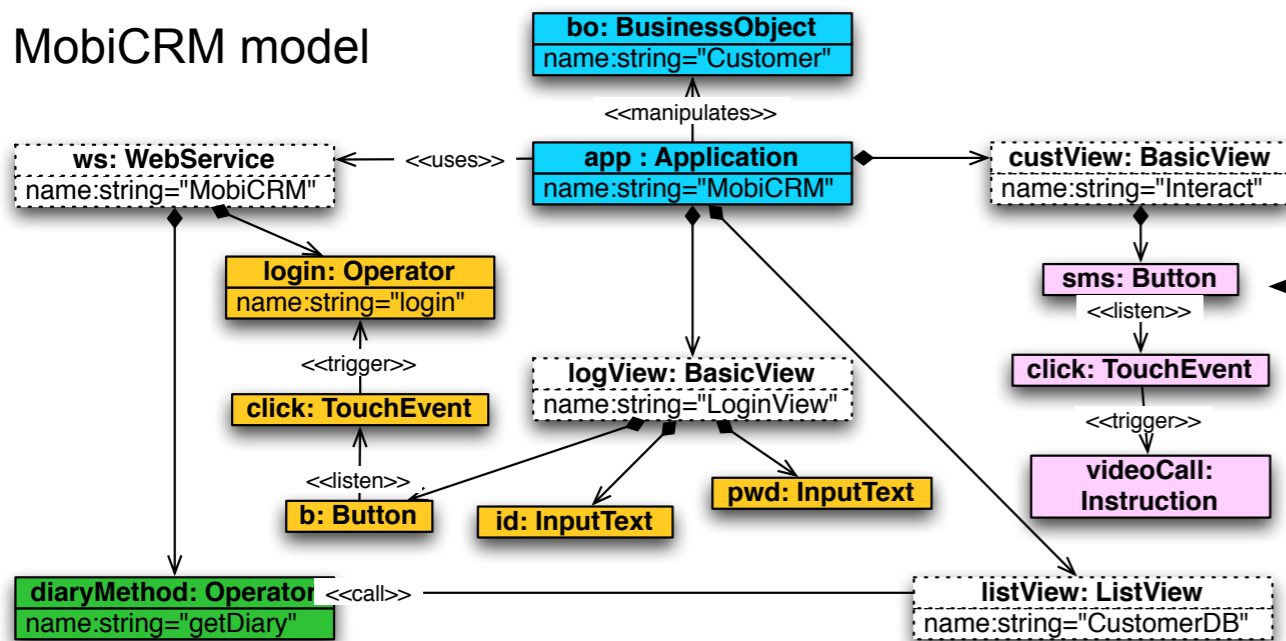
AppliDE pruned meta-model



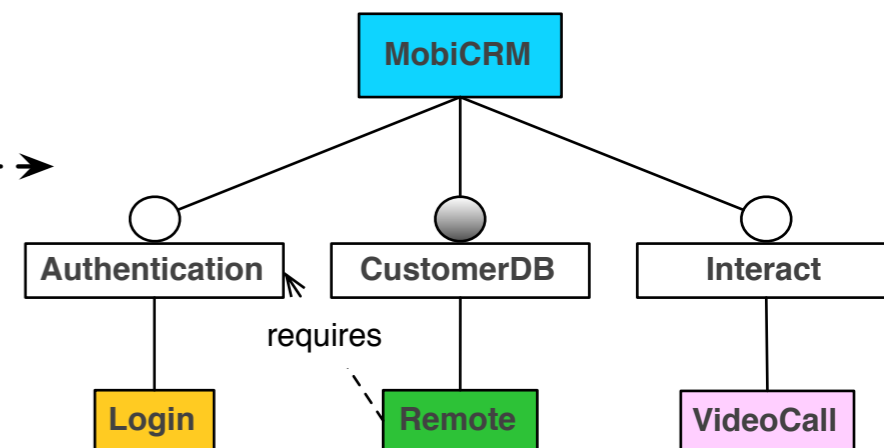
conforms to

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MobiCRM model



MobiCRM feature model



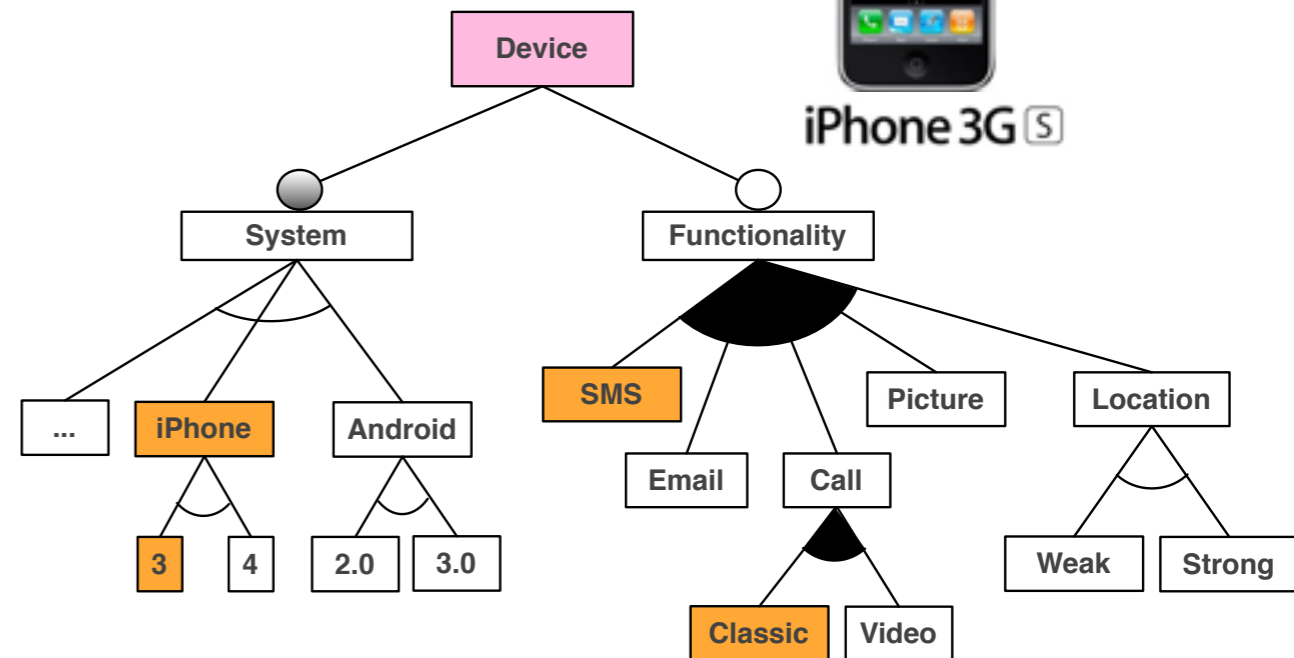
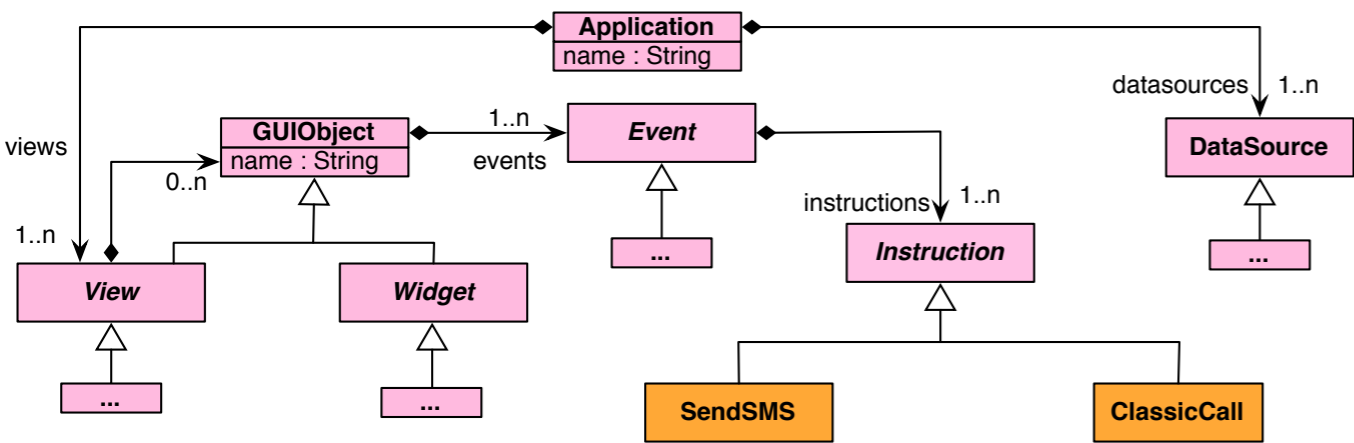
associated to



C₂: device variability



iPhone 3G S

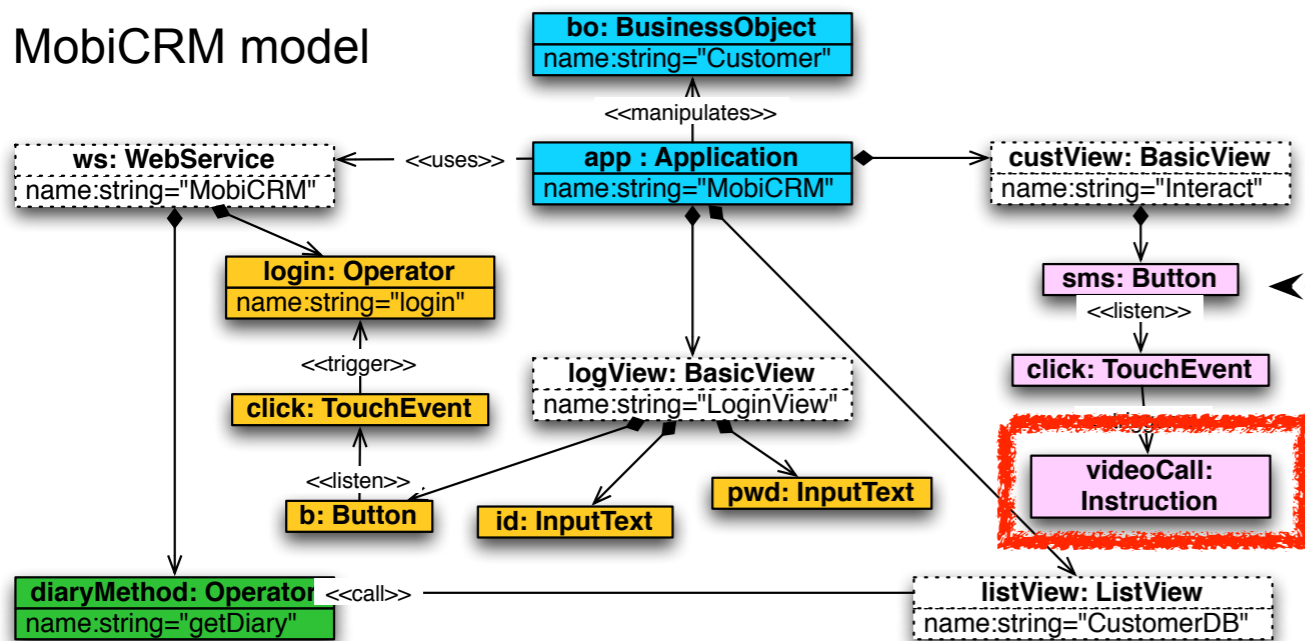


AppliDE pruned meta-model

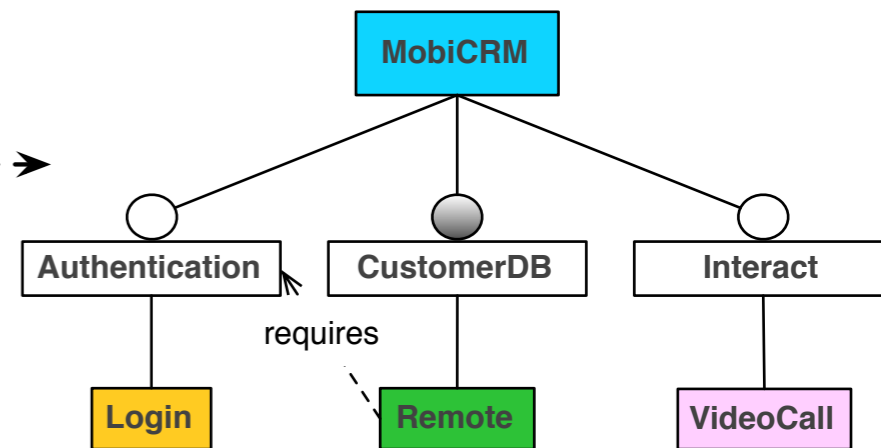
conforms to

can be executed on

MobiCRM model



MobiCRM feature model



associated to

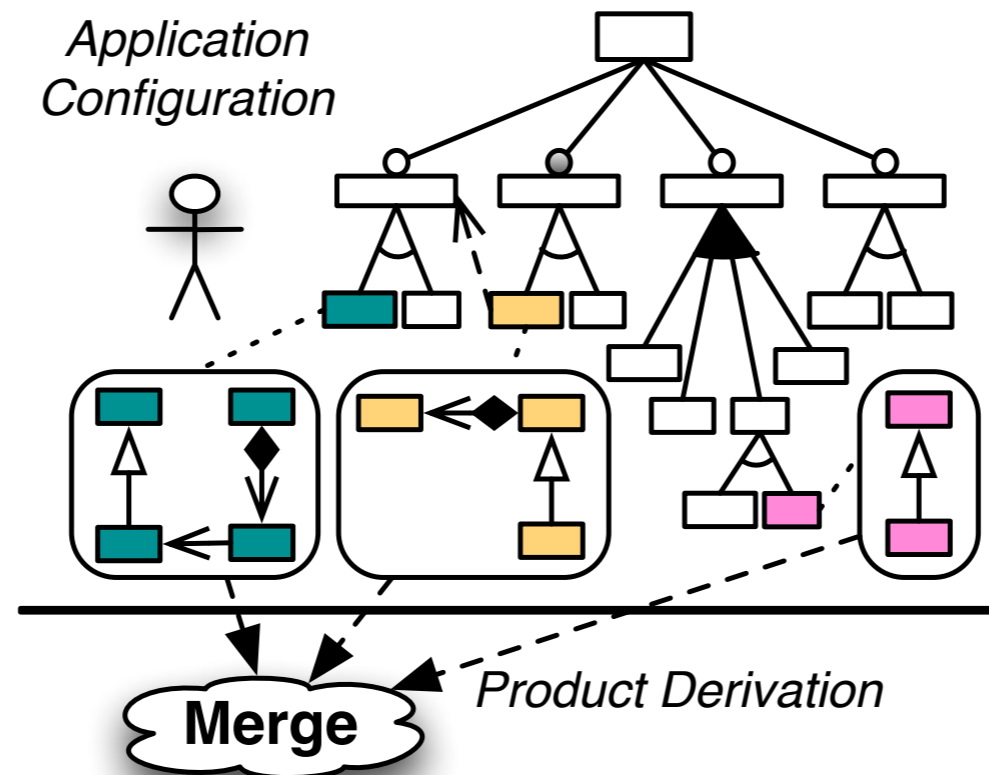


Outline

- Industrial context
- Our proposition: AppliDE
 - Handling functional variability
 - Handling device variability
- **Conclusion & Perspectives**

Conclusion

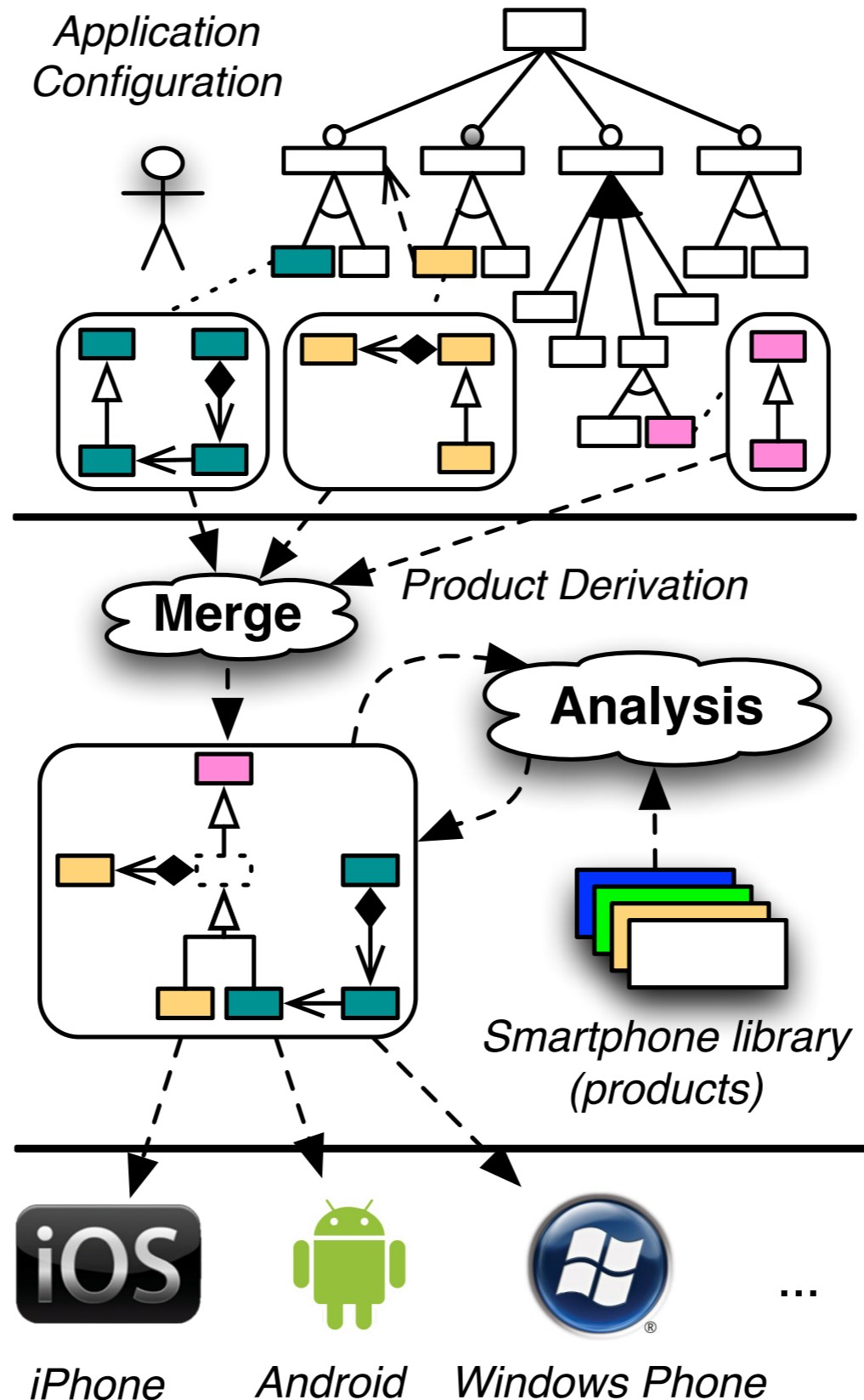
Conclusion



C_1 : functional variability



Conclusion



C₁: functional variability



C₂: device variability



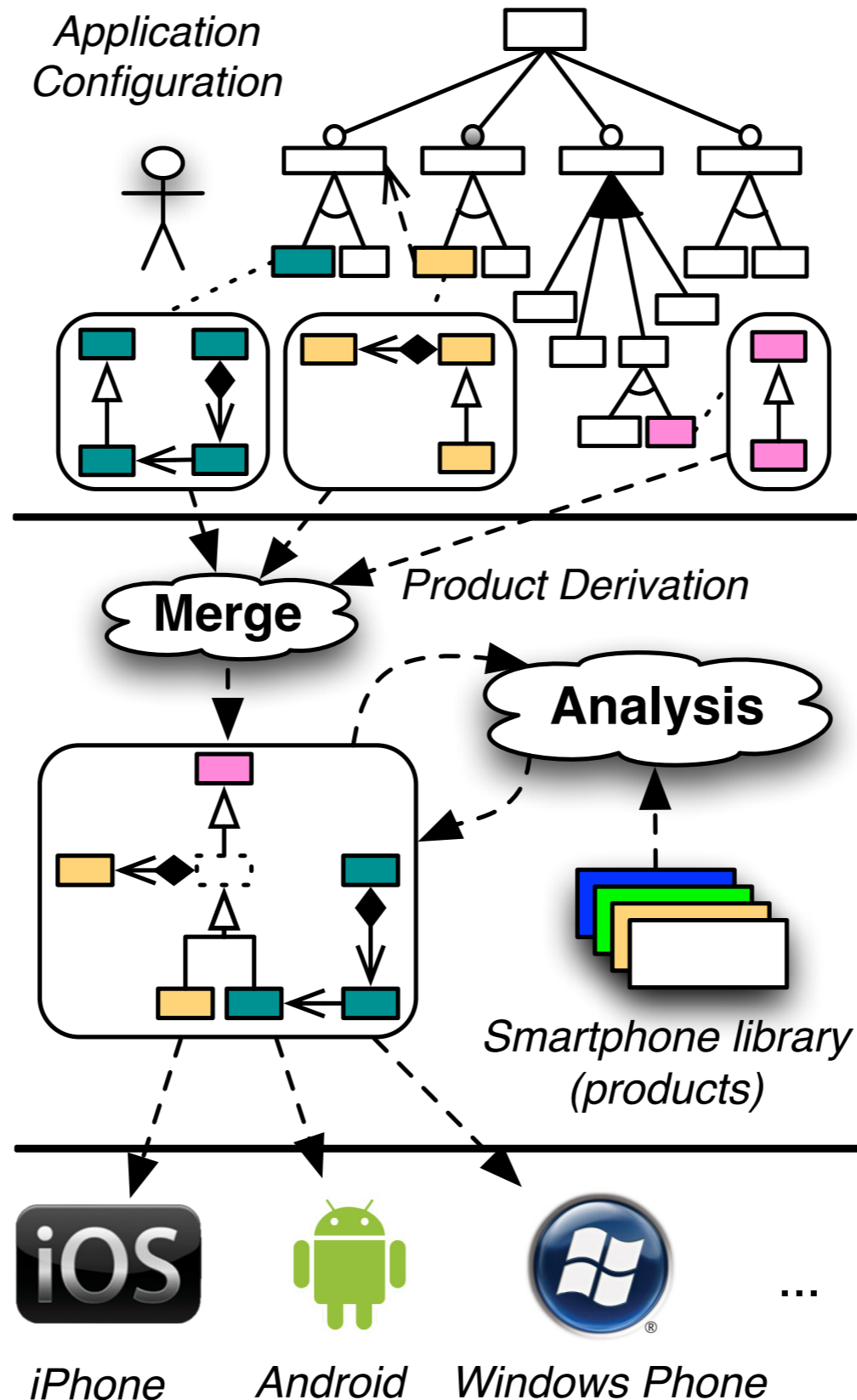
iPhone 3G S



iPhone 4

Conclusion

360 product configurations



100% generated

C₁: functional variability



C₂: device variability

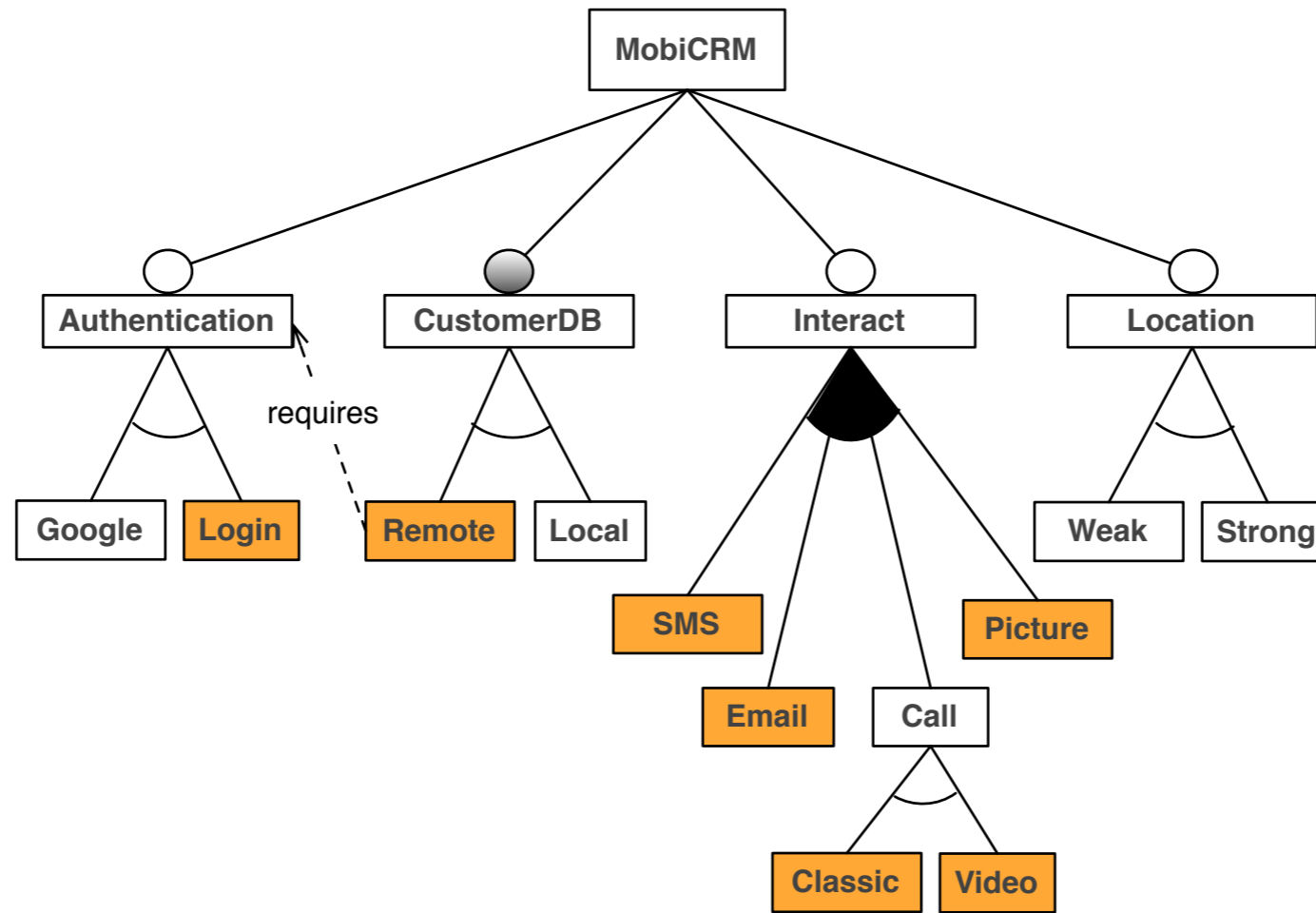


iPhone 3G S



iPhone 4

Perspectives

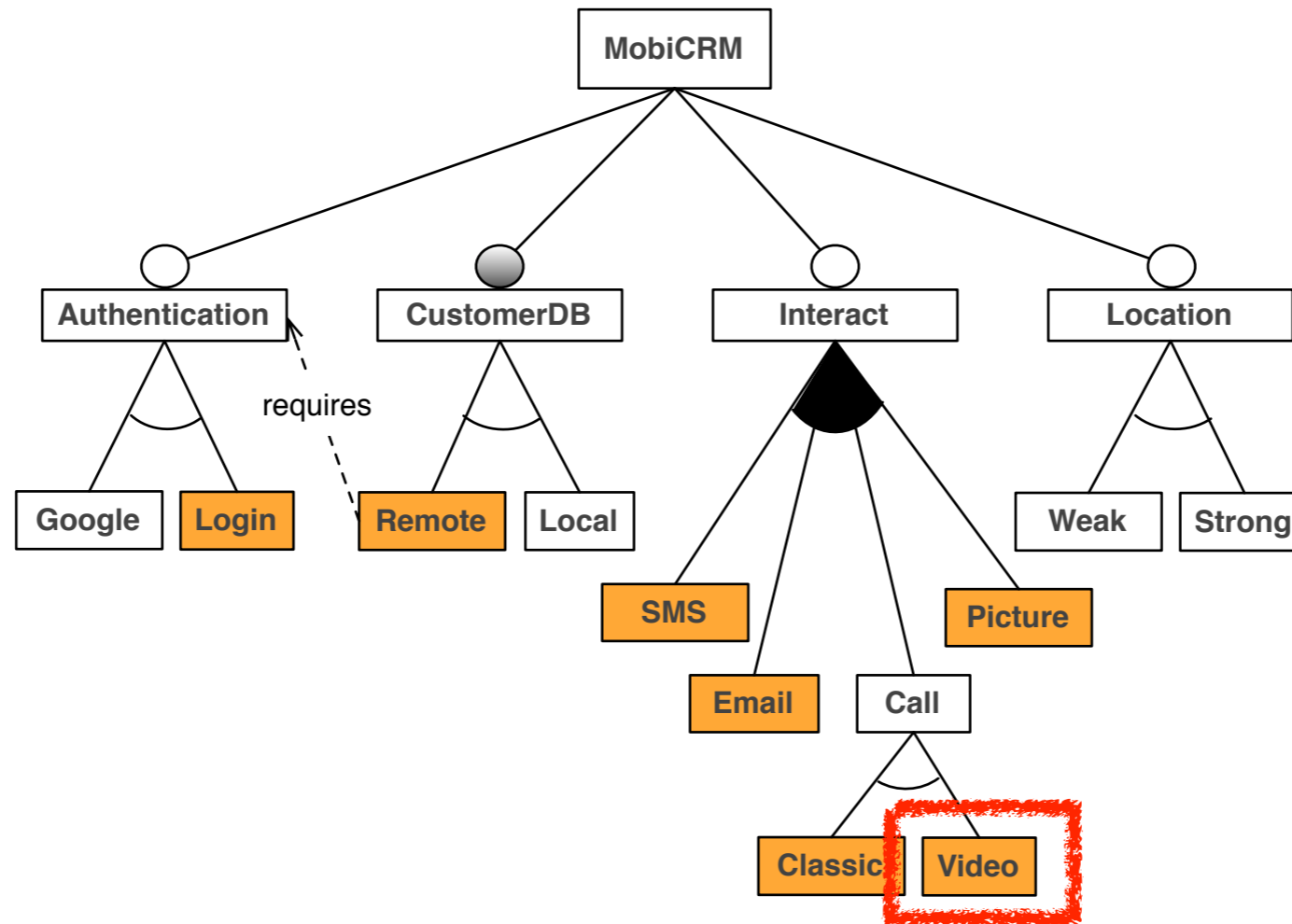


iPhone 4



GALAXY S

Perspectives

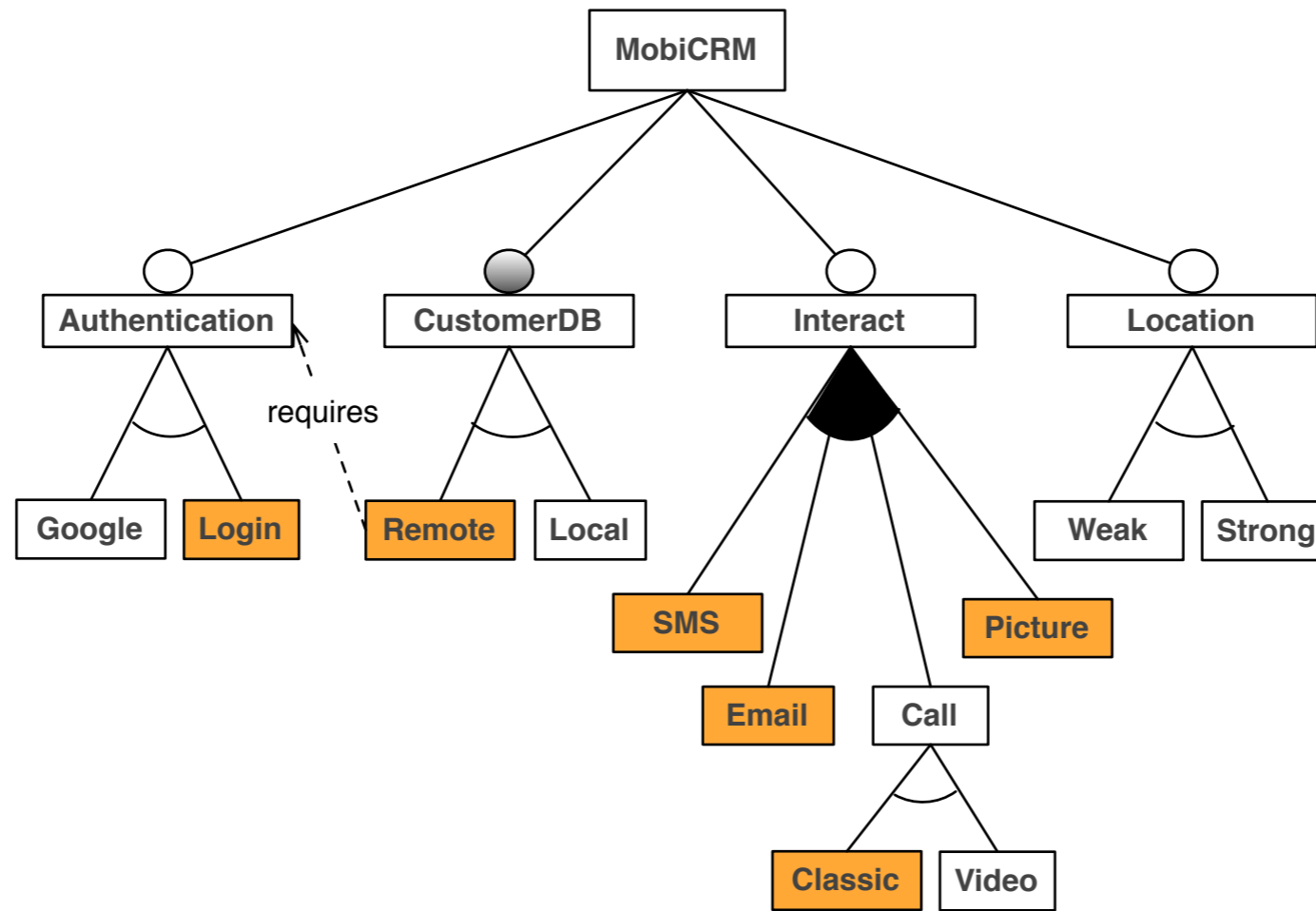


iPhone 4



GALAXY S

Perspectives



...  Windows phone



iPhone 4



iPhone 3G 



GALAXY S



GALAXY

...

Questions



clement.quinton@inria.fr