

Thesis Topics – Feature Modeling and Sampling

Thesis Topics | Sebastian Krieter | July 19, 2023





About Me

• Short CV

- 2015 Master in Computer Science (Magdeburg)
- 2022 Defended PhD Thesis (Magdeburg)
- Since 2022 Researcher at Uni Ulm

• Research interests

- Feature modeling and analysis
- Configuration sampling and testing
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Cleaning Feature Models (B/P)

- Feature models may contains anomalies (e.g., dead features, false-optional features, redundant constraints...)
- Detecting them can be automatized
- Fixing them currently requires user decisions and manual effort
- To which degree can this be automatized?
- Goals:
 - 1. Compare and discuss suitable strategies for fixing (e.g., which redundant constraints to remove)
 - 2. Implement promising strategies in FeatureIDE



Efficient Analyses for Indeterminate Hidden Features (M)

- Hidden features cannot be configured directly
- ⇒ Whether a hidden feature is selected must always be determined by other features
- Otherwise it is indeterminate
- Current analyses require much computational effort
- Are there more efficient analyses for detecting indeterminate hidden features?
- Goals:
 - 1. Improve the current analysis for finding indeterminate hidden features in FeatureIDE
 - a. Using a SAT-Solver
 - b. Using a d-DNNF
 - 2. Evaluate the new analysis



Weighted \land Directed \Rightarrow WeigthedAndDirected

Comparing Different Coverage Criteria (M)

Background: Sampling in the Problem Space



{Server, FS, OS, HFS, Mac} {Server, FS, OS, NTFS, EXT, Win} {Server, FS, OS, EXT, Deb, Log}

- Create a representative list of configurations (e.g., for testing)
 - Random
 - Coverage criteria
 - ...

Comparing Different Coverage Criteria (M)

- T-Wise coverage of samples can be measured
- In literature the definition of this metrics is ambiguous or implicitly assumed
- \Rightarrow There many alternative variants
 - Include core/dead features? Include abstract features? Merge atomic sets? Count invalid interactions?
- Which concrete metric should be used in which use case?
- Goals:
 - 1. Research which variants of the metric are used in literature
 - 2. Evaluate the impact of using different variants on the same samples

FeatureIDE und FeatJAR (P / HiWi)

- We integrate most of our research in our SPL tools
 - FeatureIDE is an Eclipse-based IDE for SPL development
 - FeatJAR is a library for SPL analysis
- These tools are frequently extended, maintained, and improved

Jeature

• Want to contribute?