



Binary Decision Diagrams for Feature-Model Analysis

SoftVarE: Topics for Theses and Projects | Tobias Heß | 01.02.2023

About Me

Short CV

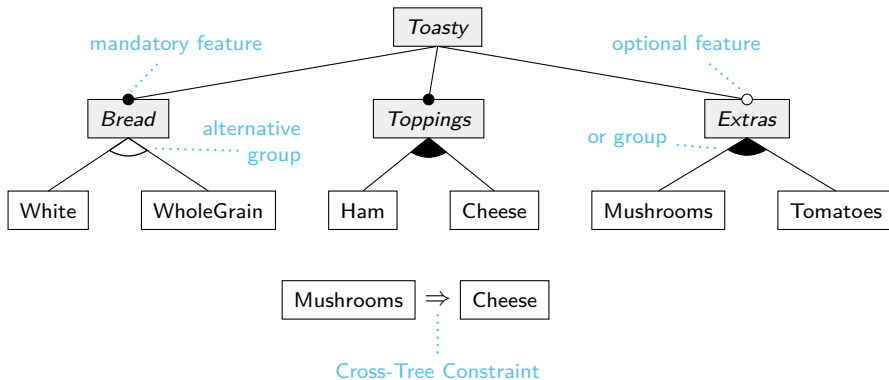
- ▶ 2012 - 2017, B.Sc. Mathematics in Ulm
- ▶ 2017 - 2020, M.Sc. Mathematics in Ulm
- ▶ 2021 - , PhD candidate



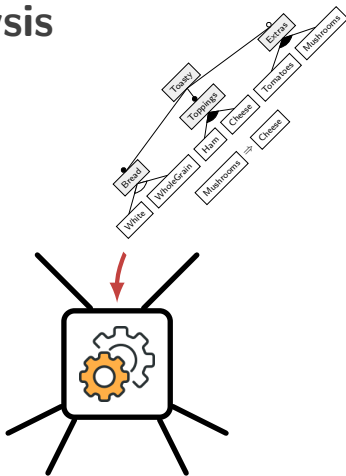
Research Interests

- ▶ Binary Decision Diagrams and variants
- ▶ Knowledge Compilation in general
- ▶ Product-Line Analysis (e.g., Sampling)

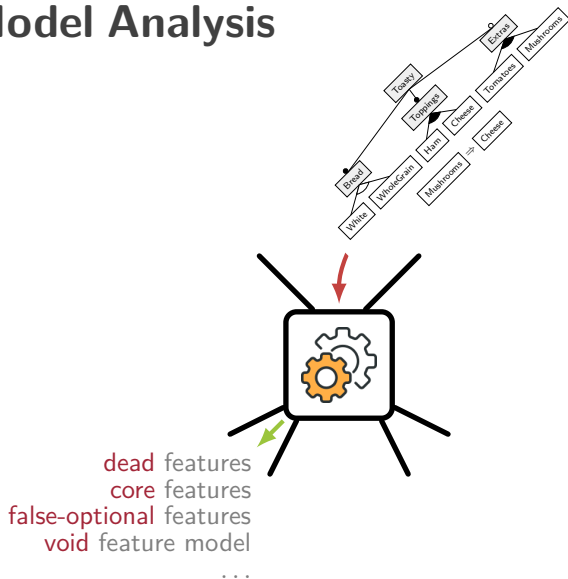
Feature Models



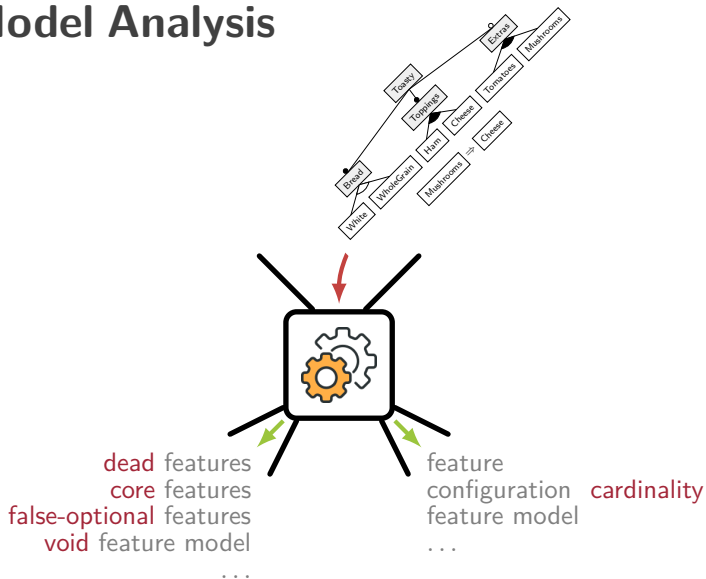
Feature-Model Analysis



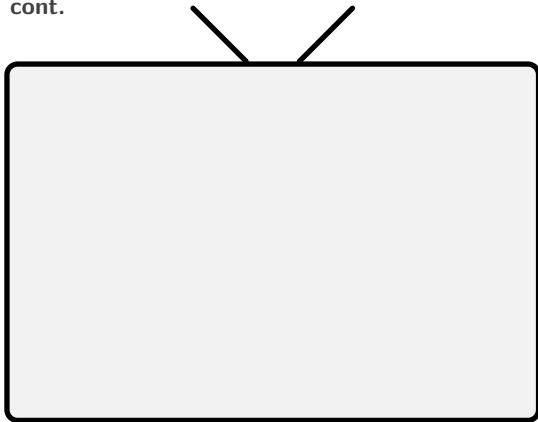
Feature-Model Analysis



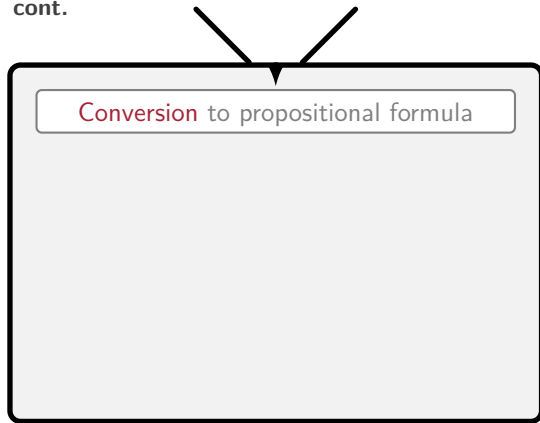
Feature-Model Analysis



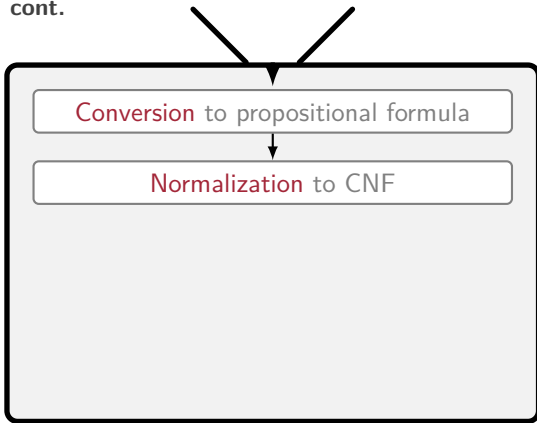
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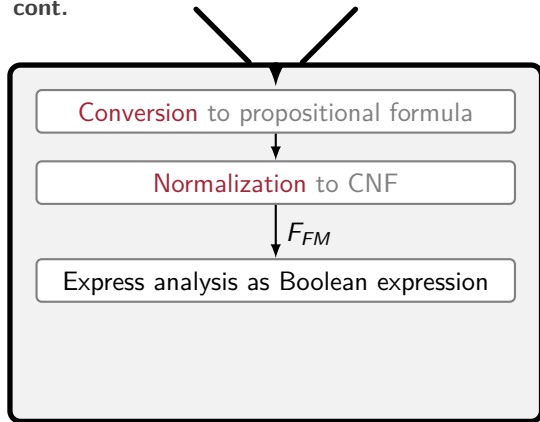
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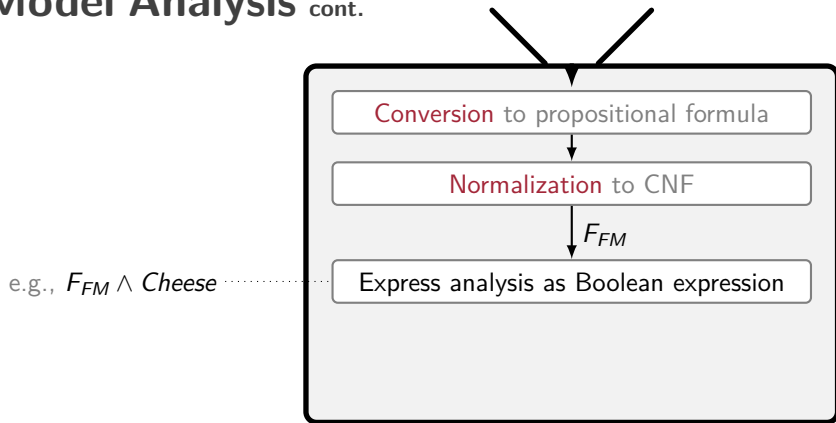
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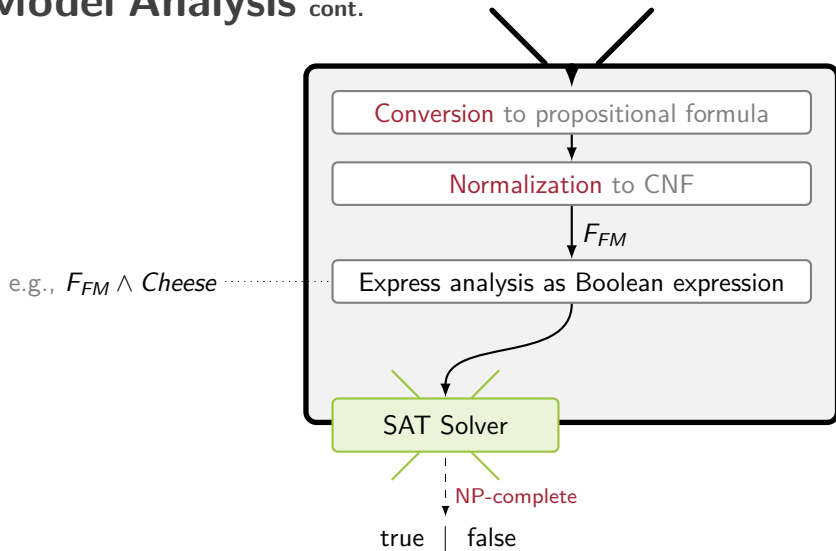
Feature-Model Analysis cont.



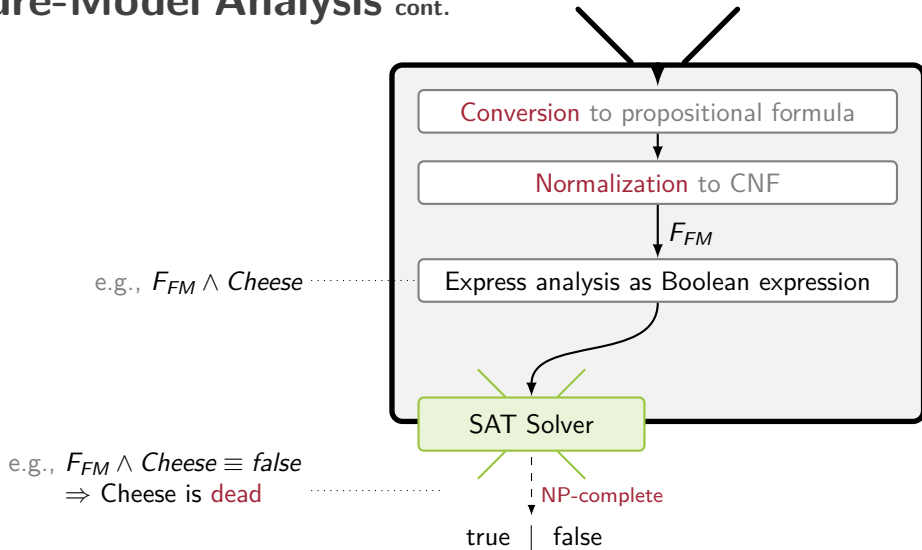
Feature-Model Analysis cont.



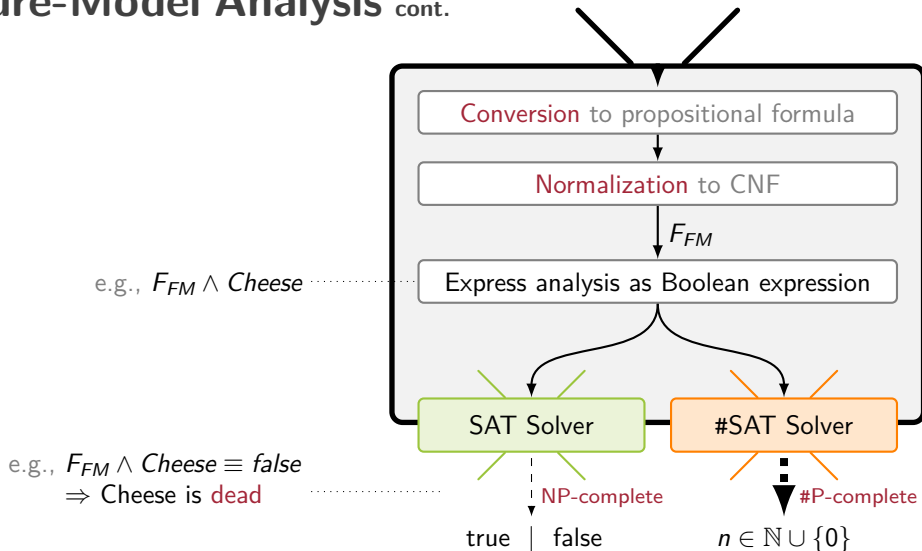
Feature-Model Analysis cont.



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Knowledge Compilation

Goal

Replace many solver calls by a one-time compilation of an **easy-to-query data structure**.

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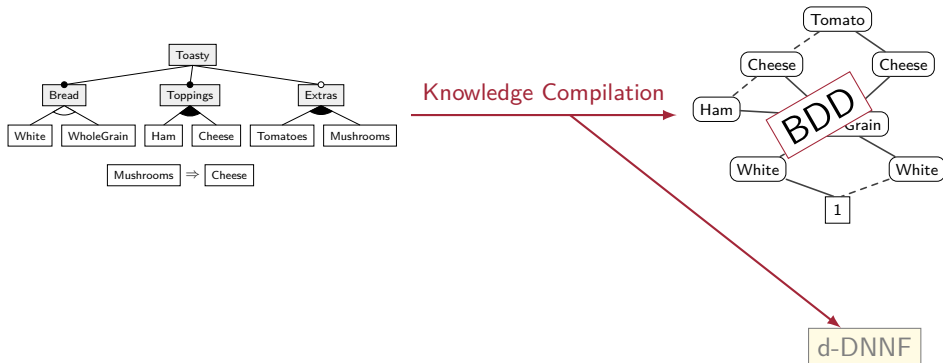
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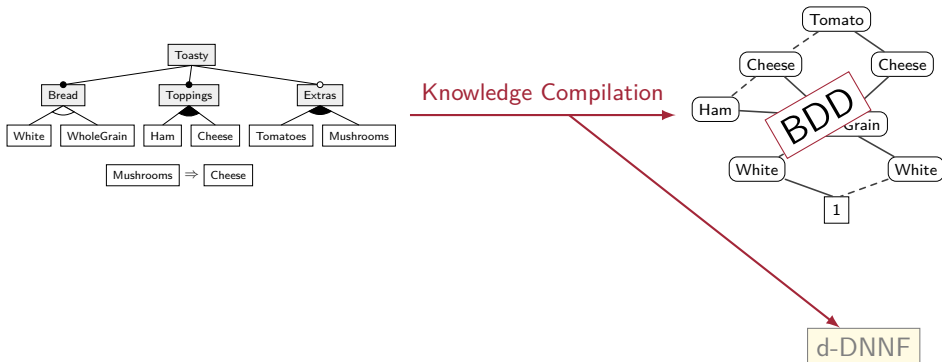
Replace many solver calls by a one-time compilation of an easy-to-query data structure.



Knowledge Compilation

Goal

Replace many solver calls by a one-time compilation of an easy-to-query data structure.



Projects

ddueruem [P]

- ▶ Wrapper to interface with (legacy) BDD libraries.
- ▶ Wrapper to interface with Sampling libraries.
- ▶ BEEF: Benchmark Execution and Evaluation Framework
- ▶ Sandbox for feature-model analysis

Stack: Python + ctypes

Goals

- ▶ Connect to FeatureIDE via a RESTful interface
- ▶ Add support for more BDD libraries
- ▶ Add support for more file formats (e.g., UVL)

ddueruem-rest [P]

- ▶ RESTful API to ddueruem
- ▶ Load Balancer
- ▶ Key-Value Store

Stack: Python + Redis

Goals

- ▶ Connect to ddueruem
- ▶ Connect to ddueruem-web
- ▶ Connect to FeatureIDE

variability.dev ~~ddueruem-web~~ [SE-P, P]

- ▶ Platform for sharing feature models and evaluation data
- ▶ Frontend for **ddueruem** (collaborative benchmarking)

Stack: Django (Python) + Vue (JavaScript) + Docker

Goals

- ▶ Frontend: User Stories, Data Visualization
- ▶ Backend: Load-balanced analysis execution, take-home analysis

OBDDimal

- ▶ Yet another BDD library

Stack: Rust

Goals

- ▶ Reach competitive performance
- ▶ Implement new ideas

Interested?



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<https://github.com/h3ssto/ddueruem-web>



<https://github.com/h3ssto/ddueruem>



For further information on the topics:

[https://www.uni-ulm.de/in/sp/teaching/
topics-for-theses-and-projects/](https://www.uni-ulm.de/in/sp/teaching/topics-for-theses-and-projects/)