Universität Siegen

mbe

Combining Reconstruction Techniques for Feature Models

Mathis Weiß

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InCyTe

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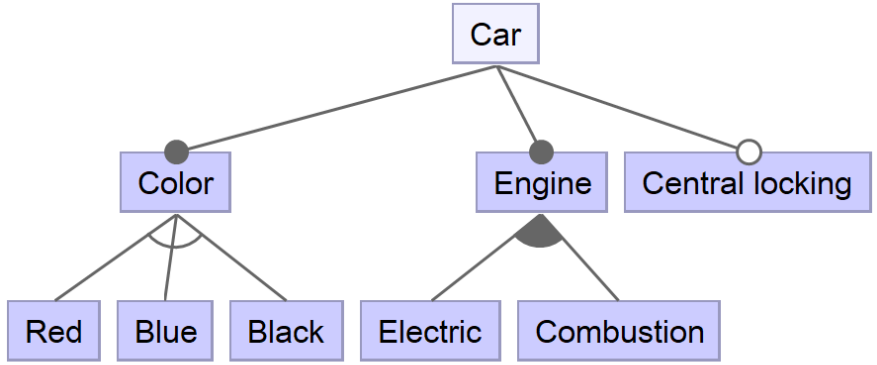
Feature Model Synthesis and Feature Model Learning

Unstructured Product Family

Reconstruction / Learning

Feature Model



Feature Model Synthesis and Feature Model Learning

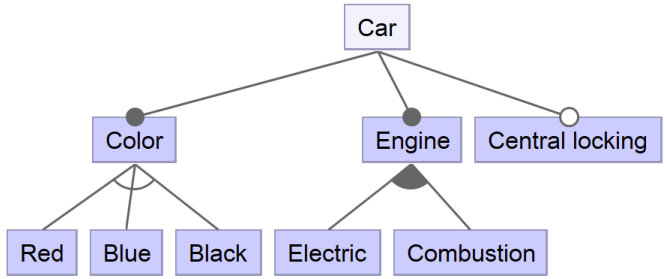
Boolean Configurations

A	B	C	Valid?
1	0	1	1
1	0	0	0

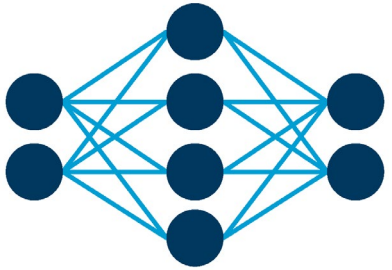
Synthesis by She et al.

Learning by Weiß et al.

Feature Model



Machine Learning Model



SAT-Solver-based Analysis vs. Machine Learning-based Analysis

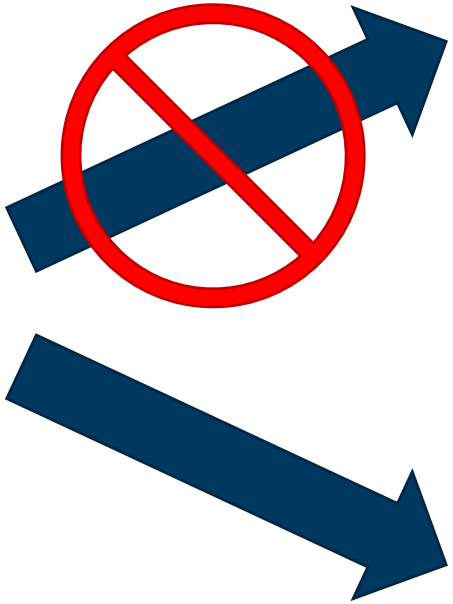
Types of analysis	SAT	ML
Validity of complete Configurations	Yes	Yes
Validity of partial Configurations	Yes	No
Sampling	Yes	No
Counting	Yes	No

Feature Model Synthesis and Feature Model Learning

Multiset Configurations

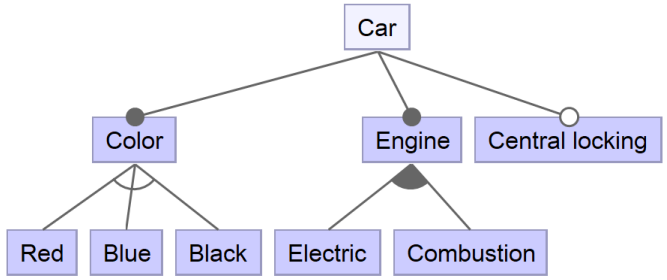
A	B	C	Valid?
4	0	3	1
7	0	0	0

Synthesis by She et al.

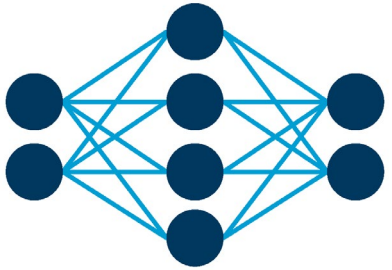


Learning by Weiß et al.

Feature Model



Machine Learning Model

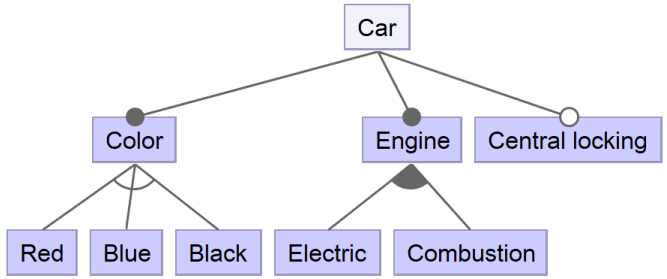


Combining Reconstruction Techniques for Feature Models

Boolean Configurations

A	B	C	Valid?
1	0	1	1
1	0	0	0

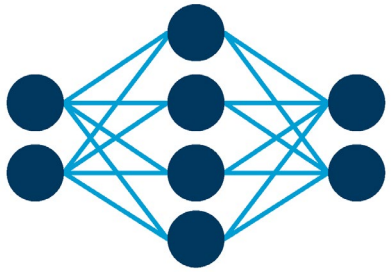
Feature Model



Multiset Configurations

A	B	C	Valid?
4	0	3	1
9	0	2	0
7	0	0	0

Machine Learning Model



Combining Reconstruction Techniques for Feature Models

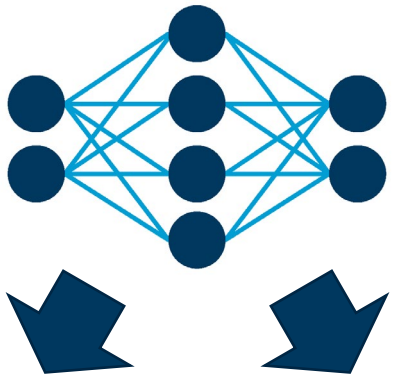
Multiset Configurations

A	B	C
3	0	0

Boolean Configurations

A	B	C
1	0	0

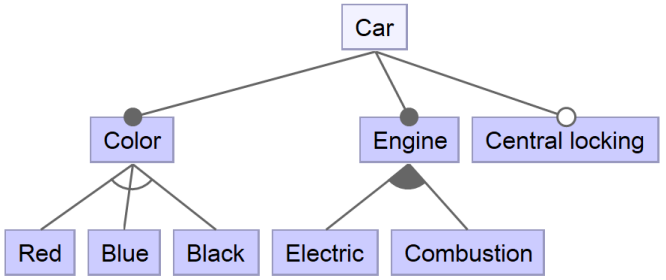
Machine Learning Model



valid

invalid

Feature Model



invalid

SAT-Solver-based Analysis vs. Machine Learning-based Analysis

Types of analysis	SAT	ML	SAT+ML
Validity of complete Configurations	Yes	Yes	Yes
Validity of partial Configurations	Yes	No	For some invalid configurations?
Sampling	Yes	No	Boolean Sample?
Counting	Yes	No	Upper Bound?

Further Types of Configurations

Boolean Configurations

A	B	C	Valid?
1	0	1	1
1	0	0	0

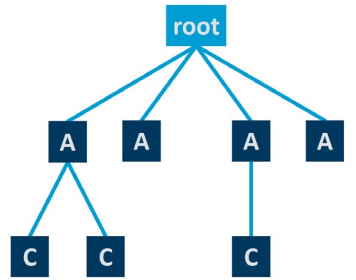
Continuous value domains

A	B	C	Valid?
4.3	0	$3.\overline{33}$	1
9.3	0	2.2	1
7.1	0	0	0

Multiset Configurations

A	B	C	Valid?
4	0	3	1
9	0	2	1
7	0	0	0

Instance-based Configurations



Combining Reconstruction Techniques for Feature Models
Conclusion