



Validating Arm Feature Configurations

Using HOL4 to write a standalone tool

Magnus Myreen
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Explaining the title

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Validating Arm Feature Configurations

Using HOL4 to write a standalone tool

- + The Arm architecture is parametrised by many Boolean feature options, e.g. FEAT_A and FEAT_B.
- + There are constraints, e.g.
`ver34 && FEAT_A --> FEAT_B`
and
`ver36 && !FEAT_B --> !FEAT_C`
- + How do we know the constraints are right?
What could go wrong?
Let me show you...

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HOL is mostly used like this:

```
open arithmeticTheory;
```

Theorem fermat:

```
  ∀a b c n.  
    0 < a ∧ 0 < b ∧ 0 < c ∧ 2 < n ⇒  
    a ** n + b ** n ≠ c ** n
```

Proof

```
  rw []  
  \\\ ... (* what should I write here? *)
```

QED

But in this work, we want to use HOL to implement *a standalone tool*.

Rest of this talk

+ Things I want to show:

- How the current implementation runs
 - + Command line and JSON input
 - + HTML and JSON output
- How it is implemented
 - + A collection of Lib files + Docker
 - + SAT and SMT support

+ What can the tool do:

- It can look for:
 - + always true / false features
 - + groups of equal features
 - + mutually exclusivity of features
 - + version anomalies
 - + redundant constraints
- It can shrink/specialise the constraint set

Questions are encouraged throughout!

arm

Thank You

Danke

Gracias

Grazie

谢谢

ありがとう

Asante

Merci

감사합니다

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Thank You

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