Cut to the Core

Automated Feature Extraction in R Using Program Slicing

FOSD '24 | Ulm University | ***Ruben Dunkel***, Florian Sihler, Thomas Thüm and Matthias Tichy | April, 2024

SP Software Engineering
Programming Languages

universität ulm

Real-World R Code

[1] Drudze et al., *Apple phenology data set and R script, related to publication "Full flowering phenology of apple tree (Malus domestica) in Pūre orchard, Latvia from 1959 to 2019"* (2021, Zenodo)

Real-World R Code

- Very long and complex
- Partial data availability (reproducibility problem)
- Take long to run

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2 } Model

3 } Model

4 } Figure

5 } Figure

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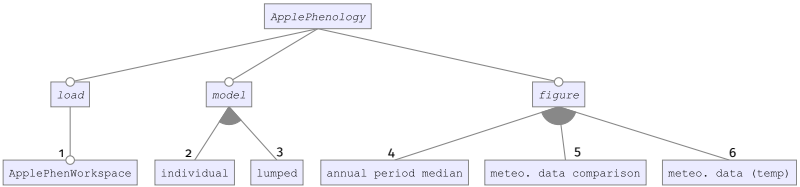

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The Plan

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sum  ← 0
prod ← 1
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for (i in 1:(n-1)) {
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(simplified dataflow)

Dataflow-Analysis

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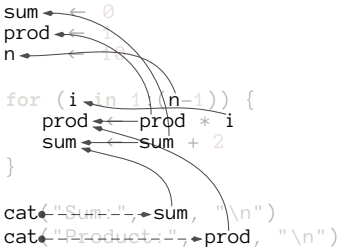

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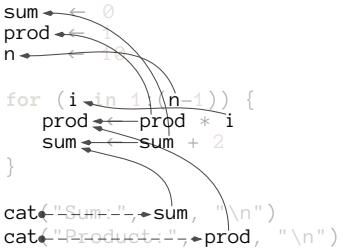

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Dataflow-Analysis → **Collect in- and outputs**

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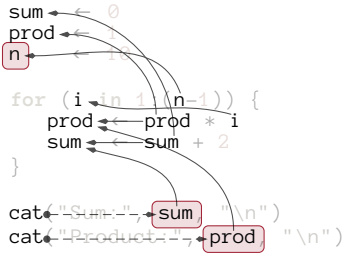

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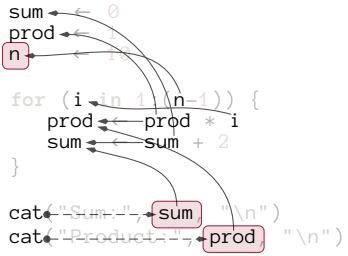

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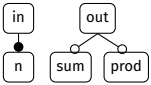

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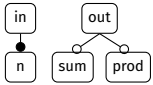

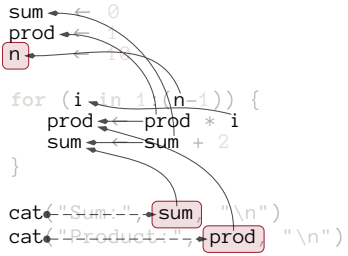

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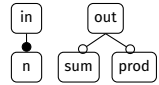

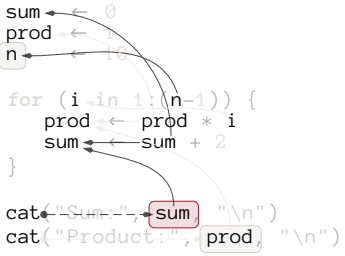

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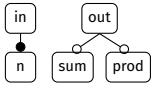


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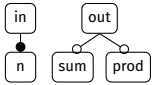

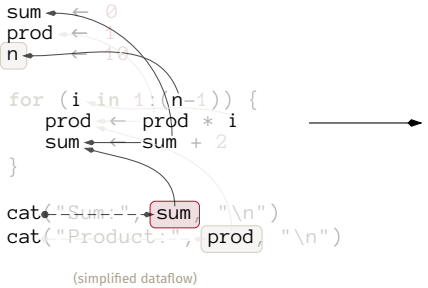

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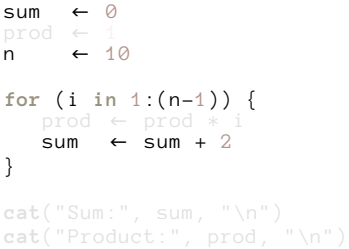

Dataflow-Analysis → **Collect in- and outputs** → Slicing with *flowR* → **Slices to Proposed Features**

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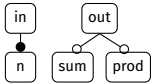

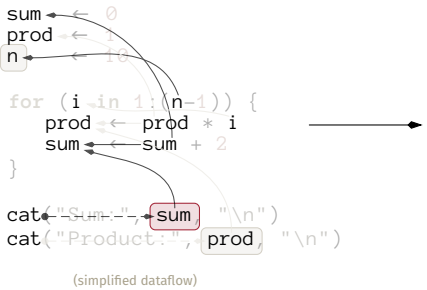

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    prod ← prod * i               (prod)
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}                                 (core)

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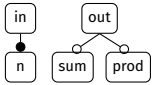


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Dataflow-Analysis → **Collect in- and outputs** → Slicing with *flowR* → **Slices to Proposed Features** → **Allow Manual Adjustments**

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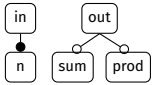


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Dataflow-Analysis → **Collect in- and outputs** → Slicing with *flowR* → Slices to Proposed Features → Allow Manual Adjustments → Add Preprocessor Directives

Open Questions

1. Who already worked with R?
2. What is your experience with code-extraction?
3. What is good/important related work?

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References

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