COMPARISON OF TWO CONFIGURATION PROCESSES FOR DSPL

This briefing reports the results of a comparison between two configuration processes for Dynamic Software Product Lines, based on the simulation of two DSPL examples.

FINDINGS

The configuration process of ConG4DaS (Contextual Goal models For Dynamic Software product lines) was compared to the configuration process of REFAS (Requirements Engineering For self-Adaptive Software systems).

The configurations obtained from both approaches were compared with respect to the satisfaction of the top priority softgoals (which can be used to model non-functional requirements in goal models).

Different context scenarios in two DSPL examples – Mobile Game and Smart Home – were simulated.

The metrics used were:

- **Pos:** number of positive contributions to the top priority softgoal;
- **Neg:** number of negative contributions to the top priority softgoal;
- **Dif:** the difference between the number of positive and negative contributions to the top priority softgoal (Pos - Neg).

The statistical test was the Wilcoxon signed rank test.

In both examples (Mobile Game and Smart Home), ConG4DaS' **Pos** count was **higher** than REFAS', i.e., ConG4DaS selected more variants with positive contributions to the top priority softgoal.

In the Smart Home example, ConG4DaS' **Neg** count was **lower** than REFAS', i.e., ConG4DaS selected fewer variants with negative contributions to the top priority softgoal. However, the null hypothesis was not rejected for the Mobile Game example.

In both examples (Mobile Game and Smart Home), ConG4DaS' **Dif** count was **higher** than REFAS', i.e., ConG4DaS selected configurations in which the difference between positive and negative contributions to the top priority softgoal was higher the in the ones selected by REFAS.

Moreover, in ConG4DaS, it is possible to relate variants and variation points (goals, tasks and resources) to a context, but that is not true for REFAS.

Additionally, for assessing the satisfaction of a softgoal, ConG4DaS takes into account all contributions in the configuration. In REFAS, when one operationalization contributes to the softgoal in the required level for the current context, the softgoal is considered to have achieved the required satisfaction level, even if another operationalization denies it.

The limitations of these findings are:

- They are based on a comparison that used only two simple examples. No industrial case was used;
- The researchers have more experience with ConG4DaS than with REFAS.

Keywords:

Dynamic Software Product Lines
Dynamic Variability
Goal Models
Self-Adaptive Systems

Who is this briefing for?

Software engineering practitioners who want to make decisions about variability configuration of Dynamic Software Product Lines based on scientific evidence.

Where the findings come from?

All findings of this briefing were extracted from the simulation based comparison conducted by Guedes et al.

What is included in this briefing?

The main findings of the simulation based comparison and brief information about the context of the findings.

What is not included in this briefing?

The description of the DSPL approaches and examples used in the comparison.

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ORIGINAL RESEARCH REFERENCE

Gabriela Guedes, Carla Silva, and Monique Soares. ***Comparing Configuration Approaches for Dynamic Software Product Lines***. Brazilian Symposium on Software Engineering, 2017 (SBES'17).