

Improving Feature Location in Long-Living Model-Based Product Families Designed with Sustainability Goals

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Reference

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Abstract

The benefits of Software Product Lines (SPL) are very appealing: software development becomes better, faster, and cheaper. Unfortunately, these benefits come at the expense of a migration from a family of products to a SPL. Feature Location could be useful in achieving the transition to SPLs. This work presents our FeLLaCaM approach for Feature Location. Our approach calculates similarity to a description of the feature to locate, occurrences where the candidate features remain unchanged, and changes performed to the candidate features throughout the retrospective of the product family. We evaluated our approach in two long-living industrial domains: a model-based family of firmwares for induction hobs that was developed over more than 15 years, and a model-based family of PLC software to control trains that was developed over more than 25 years. In our evaluation, we compare our FeLLaCaM approach with two other approaches for Feature Location: (1) FLL (Feature Location through Latent Semantic Analysis) and (2) FLC (Feature Location through Comparisons). We measure the performance of FeLLaCaM, FLL, and FLC in terms of recall, precision, Matthews Correlation Coefficient, and Area Under the Receiver Operating Characteristics curve. The results show that FeLLaCaM outperforms FLL and FLC.