

Dear SPLC MIP Award Selection Committee,

We would like to nominate the following paper for an SPLC Most Influential Paper Award:

Czarnecki, Krzysztof, and Krzysztof Pietroszek. "Verifying feature-based model templates against well-formedness OCL constraints." Proceedings of the 5th International Conference on Generative Programming and Component Engineering. ACM, 2006.

This paper paved the way for a practical and sound analysis of properties for all products of a product line without analyzing each product in isolation (these days often called family-based or variability-aware analysis). It suggested an encoding of consistency properties for a configurable system in a formalism that can be efficiently and automatically checked by state of the art SAT solvers, thus allowing to detect inconsistencies that may only occur in few out of billions of potential products of a product line. With this suggestion, it changed the game from analyzing individual configurations (as still done in product-line testing) toward analyzing entire configuration spaces.

This paper triggered a significant switch in the community from analyzing general purpose generators with expensive interactive verification techniques (e.g., S.S. Huang et al, GPCE, 2005) toward thinking about presence conditions and encodings in propositional logic that can be efficiently and automatically checked. Although initially presented for consistency checking in model templates, subsequent work picked up these ideas for type checking code with conditional compilation or composable modules (e.g., Thaker et al. GPCE 2007, Liebig et al. FSE 2013) as well as for static analysis (e.g., Bodden et al. PLDI 2013) and model checking (e.g., Classen et al. ICSE 2010). To this day, a large number of approaches and tools have been developed to efficiently check large configuration spaces, all based on similar ideas of boolean encoding of properties over configuration spaces, first introduced in this paper. For an overview of the entire field see a recent survey: Thüm et al.: A Classification and Survey of Analysis Strategies for Software Product Lines. ACM Comput. Surv. 47(1): 6:1-6:45 (2014)

At this point, analysis approaches for product lines have been scaled to systems the size of the Linux kernel with over 10000 configuration options and millions of lines of code, finding intricate bugs that rely on the combination of multiple options, which would be incredibly difficult to find with traditional ad-hoc or sampling strategies.

We support the nomination in the strongest possible way -- this paper is at the root of a whole number of approaches that have made significant advances in quality assurance for software product lines and other configurable systems.

Christian Kästner (Carnegie Mellon University)
Sven Apel (University of Passau)
Thomas Thüm (TU Braunschweig)
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