



Seminar Comp. Sci. Dept.

Search-based Transformation by Example

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July 13th Wednesday, 10:00 to 11:00 am

Venue - Computer Science Building - Room 327

Abstract - Model and code transformation (M&CT) is an important component of the Model-Driven Engineering paradigm. Despite the many advances in research, writing M&CT mechanisms is still a technical and economic challenge. In this talk, we propose three main contributions to alleviate these issues.

The first contribution aims to automate model transformations by considering the M&CT as an optimization problem. In this setting, different transformation possibilities are evaluated and, for each possibility, a quality is associated depending on its conformity with a reference set of examples. The second contribution targets the identification of code parts (design defects) to transform to improve the global quality of a program. To this end, we propose two techniques. The first one exploits an algorithm that automatically finds defect-detection rules by combining metrics and thresholds according to a set of known instances of design defects (defect examples). The rule-derivation algorithm follows a music-inspired heuristic that finds the best harmony when combining metrics. Taking inspiration from artificial immune systems, the second technique is based on the notion that the more a code deviates from examples of good practices, the more likely it is risky. The third contribution addresses the problem of M&CT testing. We propose a testing oracle function that compares target test cases with a base of examples containing good quality transformation traces, and assigns a risk level based on the dissimilarity between the two. The three contributions were evaluated successfully with industrial and widely-used open-source projects. Finally, I will give an overview of my current collaborations with different research teams (Simula-University of Oslo, Vienna University of Technology, West Virginia University, University of Alabama, University of Montreal,...) and some future research directions.

Keywords: Model-driven engineering, model transformation, software engineering by example, design defect detection, search-based software engineering, transformation testing.