MISSOURI S&T University of Science & Technology

Seminar Series Computer Science

Search-based Transformation by Example

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209 Comp. Sci. Bldg.

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, I will present three of my contributions to resolving this challenge. The first contribution aims to automate model transformations by considering 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) that need to be transformed in order to improve the global quality of a program. To this end, I will present two techniques. The first one exploits a genetic programming algorithm that automatically finds defect-detection rules by combining metrics and thresholds according to a set of known instances of design defects (defect examples). 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.

Brief Bio - Marouane Kessentini is an assistant professor in computer science at Missouri University of Science and Tech. He holds a Ph.D. in Computer Science, University of Montreal (Canada), 2011. His research interests include the application of artificial intelligence techniques to software engineering (search-based software engineering), software testing, model-driven engineering, software quality, and re-engineering. He has published around 40 papers in conferences, workshops, books, and journals including four best paper awards. His thesis was selected for the best thesis award. He has served as program committee member in several conferences and journals, and as organization member of many conferences and workshops.