

Formal Verification of Graph Transformations using an Intermediate Verification Language

- Postgraduate Workshop 2015 -

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Abstract. Model-driven engineering has been recognised as an effective way to manage the complexity of software development. Model transformation is widely acknowledged as one of the central ingredients of model-driven engineering. Among different paradigms of model transformations, I will focus on graph transformations in this presentation, and discuss about how to design verifier to prove their functional correctness by applying formal methods.

I aim at modular, reusable and reliable verifier designing. Previously, I have developed the VERIMTLR framework to assists in designing verifiers that allow automatic theorem proving of the correctness of relational model transformation. VERIMTLR draws on the BOOGIE intermediate verification language to systematically designing modular and reusable verifier. It also encapsulates the EMFTVM bytecode formalisation to ensure the reliability of the verification result of designed verifier. Thus, in this talk, I will illustrate how to adapt VERIMTLR to design verifier for the SIMPLEGT graph transformation language, in order to prove the correctness of graph transformations. Interestingly, it allows me to identify the limitations of VERIMTLR, which guides the future works for its development.

Keywords: model transformation verification, SimpleGT, automatic theorem proving, intermediate verification language, Boogie