

Verifying the Operational Correctness of ATL Transformations through a Formal Semantics for the ATL Virtual Machine

Zheng Cheng

Supervisors: Dr. Rosemary Monahan and Dr. James F. Power

Computer Science Department
National University of Ireland Maynooth
Co. Kildare, Ireland

Abstract. In this talk, I will present our approach for verifying that the standard implementation of an ATL model transformation satisfies its declarative definition. The goal is to establish operation correctness relationship between the declarative transformation definition, as it appears in the ATL matched rules, and its operational implementation in terms of bytecode instructions for the ATL virtual machine. Thus, we develop the library for explaining metamodel and OCL constructs that are involved in the ATL transformation, and the formal semantics for the ATL virtual machine. They are encapsulated in a verification system, named VeriATL. The system automatically translates both the ATL matched rules and the related bytecode instructions into the Boogie2 intermediate verification language, which in turn provides access to the Z3 theorem prover. Our experiments with VeriATL demonstrate the feasibility of this approach. They also illustrate how VeriATL can automatically identify conflicts among the ATL matched rules and termination proofs.

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