

Trustworthy Hardware from Certified Behavioral Synthesis

Fei Xie

Department of Computer Science, Portland State University

Abstract

We have developed an infrastructure for certifying hardware designs generated by behavioral synthesis, featuring a tight integration of two complementary techniques: model checking and theorem proving.

It entails developing a certified "reference flow" of synthesis transformations. The reference flow is disentangled from the workings of a production synthesis tool through new formal structure called "clocked control data flow graph" (CCDFG) formalizing internal design representation. This infrastructure has been successfully integrated with AutoESL, an industry-leading behavioral synthesis tool.

Biography

Fei Xie is an associate professor in the Department of Computer Science, Portland State University. His interests are primarily in the areas of embedded systems, software engineering, and formal methods, particularly development of formal method based techniques and tools for building safe, secure, and reliable software and embedded systems.