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# Automata Learning and Galois Connections

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## Abstract

Automata learning is emerging as an effective technique for obtaining state machine models of software and hardware systems. I will present an overview of recent work in which we used active automata learning to find standard violations and security vulnerabilities in implementations of network protocols such as TCP and SSH. Also, I will discuss applications of automata learning to support refactoring of legacy control software and identifying job patterns in manufacturing systems. As a guiding theme in my presentation, I will show how Galois connections (adjunctions) help us to scale the application of learning algorithms to practical problems.

**2012 ACM Subject Classification** Theory of computation → Active learning; Theory of computation → Regular languages; Security and privacy → Logic and verification; Software and its engineering → Model-driven software engineering; Software and its engineering → Software testing and debugging

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