Reasoning about State Constraints in the Situation Calculus

Abstract: In dynamic systems, state invariants are formulas if true, will be true in all successor states, while state constraints are formulas which hold in any reachable state. It has been shown that state invariants and constraints can be used to greatly reduce the planning search space. They are also useful in program verification. In this talk, I will present our recent work on a sound but incomplete method for automatic verification and discovery of state constraints for a class of action theories that include many planning benchmarks. Our method is formulated in the situation calculus, theoretically based on Skolemization and Herbrand Theorem, and implemented with SAT solvers. Basically, we verify a state constraint by strengthening it in a novel way so that it becomes a state invariant. In this talk, I will also present our preliminary work on automatic verification of programs in Golog -- a logic programming language for high-level agent control. This is joint work with Naiqi Li and Yi Fan.

Biography: Yongmei Liu is a Professor of Computer Science at Sun Yat-sen University in Guangzhou, China.

She received her PhD in Computer Science from the University of Toronto. Her main research interests are knowledge representation and reasoning in AI, cognitive robotics, program verification and debugging. More information about her research can be found at http://cs.sysu.edu.cn/~ymliu.

RSVP to Natalie Dunstan - n.dunstan@griffith.edu.au