Announcing the Final Examination of Brent Miller for the degree of Master of Science

Time & Location: April 8, 2015 at 10:00 AM in Engineering I 288
Title: High Performance Statistical Model Checking for Provably-Correct Control of Cyber-Physical Systems

PID controllers have been used to control various high-assurance control systems, such as artificial pancreas and unmanned aerial vehicles. To assure and maintain correct control of the system, the controller's PID parameters must be constantly tuned. Therefore, the topic PID control tuning has generated a wealth of research, resulting in nearly 50 patents issued between 1990 and 2000 to address this issue.

In this thesis, we suggest a new technique for tuning parameters of PID controller using a combination of Bayesian statistical model checking and high-performance computing. The correctness expectation from the control system is specified using probabilistic linear temporal logic and the environment is modeled as a stochastic system. Our algorithm probabilistically guarantees that the tuned PID controller will enable the high-assurance control system to satisfy the safety and performance expectations.

Major: Computer Science

Educational Career:
Bachelor's of Computer Science, BS, 2012, University of Central Florida

Committee in Charge:
Dr. Jha, Chair, EECS
Gary Leavens, UCF EECS
Shaojie Zhang, UCF EECS

Approved for distribution by Dr. Jha, Committee Chair, on March 25, 2015.

The public is welcome to attend.