Physically Informed Runtime Verification for Cyber Physical Systems

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Time : 2:30 p.m. – 3:30 p.m.
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The Hong Kong Polytechnic University

Abstract

Cyber-physical systems (CPS) are an integration of computation with physical processes. CPS have gained popularity both in industry and the research community and are represented by many varied mission critical applications. Debugging CPS is important, but the intertwining of the cyber and physical worlds makes it very difficult. Formal methods, simulation, and testing are not sufficient in guaranteeing required correctness. Runtime Verification (RV) provides a perfect complement. However, the state of the art in RV lacks either efficiency or expressiveness, and very few RV technologies are specifically designed for CPS. In this talk, I discuss a toolset, which brings formal methods (e.g., temporal logic and time automata) and physical models (through real time simulation) into CPS runtime verification. The toolset is evaluated through increasingly complex real CPS applications of smart agent system.

About the Speaker

James Xi Zheng has recently defended his PhD in Software Engineering from the University of Texas at Austin. After gaining his Master degree in Information Science from the University of New South Wales, he has been working as a senior principal consultant and solution architect for AMP, Caltex, Menulog, and a few other banks and online businesses in Sydney for over 8 years. His current research focuses on the design and implementation of middlewares for cyber physical systems (CPS). He is specifically looking into a practical way of bringing formal methods (e.g., temporal logics and automata theories) and physical models (in terms of real time simulation) into CPS runtime verification. His other research interests include distributed and multicore computation, Information Theory, Web application development, and application development for smart phones.

All are welcome!

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