Keynote

Bidirectional Transformation in Practice

Zhenjiang Hu

Abstract: Bidirectional transformations, originated from the view updating mechanism in the database community, have been attracting a lot of attention lately, both in the programming languages community and in the software engineering community. As bidirectional programming languages are growing more mature, they are getting easier to use for software engineers, more efficient, and more reliable. The strongest argument in favor of bidirectional transformation is its ability to provide a synchronization mechanisms between a source and a view, that is guaranteed to be correct by construction.

This talk will focus on practical aspects of bidirectional transformation. We will briefly review the principles of bidirectional transformation, introduce BiGUL, a simple but powerful language that allow users to specify their bidirectional behavior completely, and demonstrate its practical usefulness in developing various kinds of synchronizers including a tool that can automatically synchronize human-friendly source codes with machine-oriented abstract syntax trees.

Bio: Zhenjiang Hu is a full professor of National Institute of Informatics (NII) in Japan. He received his BS and MS degrees from Shanghai Jiao Tong University in 1988 and 1991, respectively, and PhD degree from University of Tokyo in 1996. He was a lecturer (1997–1999) and an associate professor (2000–2007) in University of Tokyo, before joining NII as a full professor in 2008. His main interest is in programming languages and software engineering in general, and functional programming, program transformation, and bidirectional programming in particular. He is the academic committee chair of the NII Shonan Meetings, IFIP WG 2.1 member, and has been the steering committee members of ICFP, Haskell, APLAS, ICMT, and BX. He is also serving on the editorial boards of IEEE Transactions on Software Engineering, Science of Computer Programming, and Software and Systems Modeling.
Keynote
Stop the Bleeding from the Heart
Charles Zhang

Abstract: Despite years of research and practice, modern static analysis techniques still cannot detect oldest and extremely well understood software bugs such as the Heartbleed, one of the most "spectacular" security flaws of the recent decade. The talk will first highlight research challenges that lead to this difficulty, followed by our latest effort, Pinpoint, in changing the conventional static analysis paradigm to address characteristics of "modern" software development. Our fused symbolic static analysis takes a holistic approach to deliver precise results scalable to millions of lines of C/C++ code. Furthermore, I will share some lessons learned in the commercialization process of Pinpoint in meeting the market requirements of Chinese software vendors.

Bio: Charles Zhang is an Associate Professor, the director of the Cybersecurity Lab in the Department of Computer Science and Engineering, HKUST, and a co-founder of Sourcebrella Inc. His major research interest is the use of program analysis techniques to improve software reliability. He has published extensively at premium conferences and journals of programming languages and software engineering. He has served on many organizational and technical committees of international conferences. He is currently an associate editor of IEEE TSE. His research received many awards including PLDI distinguished paper award, ACM SIGSOFT Doctoral Dissertation Award, and IBM PhD fellowships. His research is supported by Research Grant Council, Innovation and Technology Fund, and grants from Microsoft and IBM. Charles obtained his Ph.D, M.Sc, and B.Sc. with honours, all from University of Toronto.