Teng Zhang

Curriculum Vitae

Department of Computer and Information Science
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Education

2015–2021 **Ph.D. in Computer and Information Science**, University of Pennsylvania, Philadelphia PA, USA.

- **Ph.D. Thesis:** "*RV-enabled framework for self-adaptive software*," under supervision of **Prof. Oleg Sokolsky and Prof. Insup Lee**

2011–2014 **M.Sc. in Computer Technology**, Beihang University, Beijing, China.

- **M.Sc. Thesis:** "*Automatic Generation of Multi-core code from Synchronous Language Signal*," under supervision of **Prof. Kai Hu**

2007–2011 **B.Sc. in Computer Science**, Beihang University, Beijing, China.

- **B.Sc. Thesis:** "*Formal Verification of TASM Models by Translating into UPPAAL*," under supervision of **Prof. Kai Hu**

Research Interests

- **Runtime verification; software verification; model-based development; programming languages**

Research Projects

2015–Present **SMEDL: Runtime Adaptation Framework**.

- Role: main contributor
- This project proposes a framework for runtime verification and adaptation of large-scale systems. I have designed a DSL for describing the runtime monitor and developed the compiler to generate executable checker code in C. I have formalized the core semantics of the DSL in Coq and developed an algorithm to check the determinism of a monitor specification for generating reliable checker code. I also extended the DSL with pre-defined adaptation actions and proposed a framework for reasoning about an implementation of adaptation actions with respect to functional correctness of the program to be monitored.

2012–2014 **Code generator from SIGNAL to OpenMP**.

- Role: main contributor
- This project proposes a compiler to generate more efficient OpenMP parallel code to simulate the equation-style specifications of the Synchronous language SIGNAL. I have developed the theory and the tool.

2011–2014 **Verification of AADL through model transformation**.

- Role: contributor

- This project presents a well-founded methodology to model safe-critical systems using AADL(Architecture Analysis & Design Language) and transforms the model into TASM(Time Abstract State Machine) and UPPAAL to verify functional and non-functional properties. I was responsible to implement the transformation from TASM to UPPAAL and part of the transformation from AADL to TASM.

Publications

Journal

- Kai Hu, **Teng Zhang**, Zhibin Yang, et al. “Exploring AADL Verification Tool through Model Transformation”, Journal of Systems Architecture”, 2015, 61(3): 141-156.
- Kai Hu, **Teng Zhang**, Zhibin Yang, Wei-Tek Tsai. “Simulation of Real-time Systems with Clock Calculus”, Simulation Modelling Practice and Theory, 2015, 51: 69-86.
- Kai Hu, **Teng Zhang**, Zhibin Yang. “Multi-threaded Code Generation from Signal Program to OpenMP”, Frontiers of Computer Science, 2013, 7.5: 617-626.

Conference and Workshop

- **Teng Zhang**, John Wiegley, Theophilos Giannakopoulos, Gregory Eakman, Clément Pit-Claudel, Insup Lee, and Oleg Sokolsky. "Correct-by-construction implementation of runtime monitors using stepwise refinement", In Proceedings of the 4th International Symposium Dependable Software Engineering: Theories, Tools, and Applications - SETTA ’18, pages 31–49. Springer International Publishing, 2018.
- **Teng Zhang**, John Wiegley, Insup Lee and Oleg Sokolsky. "Monitoring Time Intervals”, In Proceedings of the 17th Conference on Runtime Verification (RV 2017), 330-345, 2017.
- **Teng Zhang**, Ramneet Kaur, Insup Lee, and Oleg Sokolsky, "Runtime verification of parametric properties using SMEDL", SmolkaFest, 2019.
- **Teng Zhang**, Greg Eakman, Insup Lee and Oleg Sokolsky, "Overhead-aware deployment of runtime monitors", In Proceedings of the 19th Conference on Runtime Verification (RV 2019), 375-381, 2019.
- **Teng Zhang**, Greg Eakman, Insup Lee and Oleg Sokolsky, "Overhead-aware deployment of runtime monitors", In Proceedings of the 19th Conference on Runtime Verification (RV 2019), 375-381, 2019.
- **Teng Zhang**, Greg Eakman, Insup Lee and Oleg Sokolsky, "Flexible monitor deployment for runtime verification of large scale software.", In Proceedings of the International Symposium on Leveraging Applications of Formal Methods, 42-50, 2018.
- **Teng Zhang**, Peter Gebhard and Oleg Sokolsky, “SMEDL: Combining Synchronous and Asynchronous Monitoring”, In Proceedings of the 16th Conference on Runtime Verification (RV 2016), 482-490, 2016.

Teaching Experiences

Fall 2016, Fall 2017 **Teaching Assistant**, CIS 441/541 Embedded Software for Life-Critical CPS/IoT Applications, University of Pennsylvania.

Professional and Industrial Experience

- **Automated reasoning group in Amazon AWS, USA**, Summer 2020
  Applied Scientist Intern
  Mentor: Dr.Nathan Chong
- **GrammaTech, USA**, Summer 2019
  Software Engineer Intern
- **Qunar.come, China**, 2014-2015
  Full-time Java Software Engineer
- **Institut de Recherche en Informatique de Toulouse, France**, Spring 2013
  Research Assistant
  Mentors: Dr.Mamoun Filali, Prof. Jean-Paul Bodeveix

Service

- **Subreviewer**
  ATVA 2016, DATE 2017, FORMATS 2017, EMSOFT 2018, RV 2018, RV 2019, SAFECOMP 2019, ICCPS 2019, ICCPS 2021, Software Testing, Verification and Reliability (STVR) 2017, Information and Computation 2019.

Technical Skills

- **Modeling language, verification and theorem proving**
  AADL, SIGNAL, UPPAAL, Viper(Prusti), Z3, Coq.
- **Languages and technologies**
  Java, C/C++, Python, Haskell, Rust, Eclipse plug-in development and model transformation.

Honors & Awards

- National Scholarship for Academic and Research Excellence ((top 0.01% among all graduate students in China)), 2013

References

- Oleg Sokolsky, sokolsky@cis.upenn.edu
- Insup Lee, lee@cis.upenn.edu
- Nathan Chong, ncchong@amazon.com