Ting Dai

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Research Interests

My general research interests are in the areas of systems, with a current focus on applying static code analysis and machine learning techniques on cloud computing and system reliability. I am also interested in blockchain and cryptography technologies.

Education

- North Carolina State University, Raleigh, NC — 2014 - 2019
  Ph.D. in Computer Science Advisor: Xiaohui (Helen) Gu *GPA: 4.0*
- Nanjing University of Posts and Telecommunications, Nanjing, China — 2011 - 2014
  M.E. in Computer Software and Theory *GPA: 3.78*
- Nanjing University of Posts and Telecommunications, Nanjing, China — 2007 - 2011
  B.E. in Information Security *GPA: 3.85*

Professional Experience

- **Research Assistant NC State Univ. August, 2015 - present**
  Data-corruption/Timeout/Performance Diagnosis, Debugging: Present DScope to statically detect data-corruption related software hang bugs in cloud server systems, via loop path extraction, I/O dependent loop identification, and false positive pruning. Empirically study timeout problems in cloud systems and present TScope to dynamically identify timeout bugs, via kernel-level system call tracing, machine learning based anomaly detection, and feature extraction schemes. Present Hytrace, a hybrid approach to performance bug diagnosis in production cloud infrastructures using both static & dynamic analysis.
- **Graduate Intern IBM Research May - August, 2018**
  Presented a non-interactive zero knowledge approach, Fabric-NIZK to achieve confidential transactions. Implemented Fabric-NIZK in Hyperledger Fabric which has the execution-order-validation architecture, different from other blockchain systems.
- **Software Engineer InsightFinder Inc. June - August, 2016**
  Implemented the InsightAgent to collect system calls and report to the server. Developed the APM intelligence engine to identify problems in cloud applications using machine learning algorithms.
- **Research Assistant NC State Univ. & Credit Suisse May - August, 2015**
  Developed CCM, an open-source Cloud Configuration Management system for elastic application deployment in private clouds. Specifically, made an easy-to-use application deployment tool. Implemented automatic component composition and instantiation. Accomplished elastic auto-scaling to handle overload conditions, resource contentions, and system anomalies.

Publications

1. **Ting Dai**, Jingzhu He, Shan Lu, Xiaohui Gu, and Peipei Wang, "DScope: Detecting Real-World Data Corruption Hang Bugs in Cloud Server Systems", Proc. of ACM Symposium on Cloud Computing (**SoCC**), Carlsbad, CA, October, 2018.
2. Jingzhu He, **Ting Dai**, and Xiaohui Gu, "TScope: Automatic Timeout Bug Identification for

Server Systems", Proc. of IEEE International Conference on Autonomic Computing (**ICAC**), Trento, Italy, September, 2018.

3. **Ting Dai**, Daniel Dean, Peipei Wang, Xiaohui Gu, and Shan Lu, "Hytrace: A Hybrid Approach to Performance Bug Diagnosis in Production Cloud Infrastructures", IEEE Transactions on Parallel and Distributed Systems (**TPDS**), 2018.
4. **Ting Dai**, Jingzhu He, Xiaohui Gu, and Shan Lu, "Understanding Real-World Timeout Problems in Cloud Server Systems", Proc. of IEEE International Conference on Cloud Engineering (**IC2E**), Orlando, FL, April, 2018.
5. **Ting Dai**, Daniel Dean, Peipei Wang, Xiaohui Gu, and Shan Lu, "Hytrace: A Hybrid Approach to Performance Bug Diagnosis in Production Cloud Infrastructures", Proc. of ACM Symposium on Cloud Computing (**SoCC**), poster session, Santa Clara, CA, September, 2017.
6. Haiping Huang, Tianhe Gong, Tao Chen, Mingliang Xiong, Xinxing Pan, and **Ting Dai**, "An Improved TESLA Protocol Based on Queuing Theory and Benaloh-Leichter SSS in WSNs", Journal of Sensors (**J. Sensors**), Vol. 2016, Article ID 9021650, 13 pages, 2016.
7. **Ting Dai**, Haiping Huang, Yang Lu, Ruchuan Wang, and Xinxing Pan, "Research on Migration Strategy of Mobile Agent in Wireless Sensor Networks", International Journal of Distributed Sensor Networks (**IJDSN**), Vol. 2013, Article ID 642986, 13 pages, 2013.
8. Haiping Huang, **Ting Dai**, Ruchuan Wang, Xiaolin Qin, and Jiutian Chen, "A Novel Self-Renewal Hash Chain Scheme based on (t, n)-Threshold and Division Tree", Journal of Communications (**JoC**), Vol. 34, No. 4, pp. 70-81, Apr. 2013.
9. **Ting Dai**, Haiping Huang, Ruchuan Wang, and Xinxing Pan, "Novel self-renewal Hash Chain based on Ito-Saito-Nishizeki secret sharing scheme", The Journal of China Universities of Posts and Telecommunications (**JCUPT**), Vol. 19(Suppl. 2), pp. 122-127, Oct. 2012.
10. Li Liu, **Ting Dai**, Yi Dou, Haiping Huang, Junjie Huang, and Ning Ye, "Simulation of the Park Behaviors in a Shopping Mall of Dalian", Advanced Material Research (**ADV MAT RES**), Vol. 317-319, pp. 2133-2137, Aug. 2011.

Selected Patents

1. Haiping Huang, **Ting Dai**, etc, "Container logistic tracking and positioning method based on tag sensor network", Patent No. CN102325345 B on November 27, 2013.
2. Haiping Huang, **Ting Dai**, etc, "Method for broadcast authentication of wireless sensor network based on automaton and game of life", Patent No. CN102164369 B on September 25, 2013.

Selected Professional Services

- **Recent Presentations**: IBM Watson 2018, IC2E 2018, SoCC 2017, Credit Suisse 2015, etc.
- **Conference/Journal Review**: APSys 2018, IC2E 2018, TPDS 2017, etc.
- Student member of IEEE and ACM.

Awards/Honors

- SoCC Travel Scholarship, 2017

- Outstanding Master Award, 2014, NJUPT
- Outstanding Postgraduate Dissertation Award, 2014, NJUPT
- National Scholarship for Postgraduate Students, 2012 - 2013, China
- Scholarship for Outstanding Postgraduate Students, 2012 - 2013, NJUPT
- Star of the Academy Award, 2012 - 2013, NJUPT
- The 2nd Prize in National Postgraduate Mathematical Contest in Modeling, 2012, China
- The 2nd Prize in National College and Univ. Contest of Computer Courseware, 2012, China
- The "Hengtong Optic-electric" Scholarship, 2012, NJUPT
- The 1st Prize in Graduate English Dubbing Contest, 2012, NJUPT
- The 3rd Prize in the 12th "Challenge Cup" Science and Technology Contest, 2011, Jiangsu
- Outstanding Bachelor Award, 2011, NJUPT
- Outstanding Undergraduate Dissertation Award, 2011, NJUPT
- The Best Student Award, 2008 - 2010, JNUPT
- The First-Class Scholarship, 2008, 2010, JNUPT
- The Second-Class Scholarship, 2009, NJUPT
- The Winning Prize in the "Zhongfu-Nanyou Cup" Information Security Contest, 2009, NJUPT