Yuanchun Li

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About Me

I'm a Senior Researcher in the Systems and Networking research group at Microsoft Research Asia (MSRA). Before joining MSRA, I obtained Ph.D. and B.S. in Computer Science from Peking University in 2019 and 2014 under the supervision of Yao Guo and Xiangqun Chen. I was also advised by Jason Hong and Yuvraj Agarwal when I was a visiting student in the Human-Computer Interaction Institute at Carnegie Mellon University.

Research Interests

My primary research interest is **software and systems for ubiquitous intelligence**, which lies in the intersection of ubiquitous computing (UbiComp), software engineering (SE), and artificial intelligence (AI). I've published around 20 research papers in premier venues such as UbiComp, FSE, ICSE, ISSTA, and SIGIR, including a best paper nomination in UbiComp '2016 and a best paper in IS-EUD '2017. Some of the papers have become popular open-source tools in the area. The focus of my recent work lies on the reliablility, scalability, and privacy issues of AI and AIoT.

Education

Ph.D., Computer Science, Peking University   **2014.09 – 2019.06**

- Advisors: Yao Guo, Xiangqun Chen, Gang Huang

Visiting Student, HCII, Carnegie Mellon University   **2016.09 – 2017.09**

- Advisors: Jason I. Hong, Yuvraj Agarwal

B.S., Computer Science, Peking University   **2010.09 – 2014.09**

Professional Experiences

Researcher/Senior Researcher, Microsoft Research Asia, Beijing, China   **2019.07 – Now**

- Systems and Networking Research Area, HEX Group
- Working on reliability and privacy of AI and AIoT

Research Intern, Microsoft Research, Redmond, USA   **2018.05 – 2018.08**

- Advisors: Oriana Riva
- Worked on automatically extracting conversational skills from websites

Software Intern, Xiaomi Monetization Department, Beijing, China   **2017.10 – 2018.05**

- Advisors: Chengming Wen
- Worked on building personal knowledge graphs for privacy-friendly user modeling

Major Peer-Reviewed Conference and Journal Papers

*indicates co-primary and/or corresponding author.

1. Chengxu Yang (intern), **Yuanchun Li***, Mengwei Xu, Zhenpeng Chen, Yunxin Liu, Gang Huang, Xuanzhe Liu. "TaintStream: Fine-grained Taint Tracking for Big Data Platforms through Dynamic Code Translation". (ESEC/FSE 2021).

2. **Yuanchun Li**, Ziqi Zhang, Bingyan Liu, Ziyue Yang, Yunxin Liu. "ModelDiff: Testing-based DNN Similarity Comparison for Model Reuse Detection". The ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2021).

3. **Yuanchun Li**, Oriana Riva. "Glider: A reinforcement learning approach to extract UI scripts from websites". 44th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2021).

4. Liu Wang, Ren He, Haoyu Wang, Pengcheng Xia, **Yuanchun Li**, Lei Wu, Yajin Zhou, Xiapu Luo, Yulei Sui, Yao Guo, Guoai Xu. "Beyond the Virus: A First Look at Coronavirus-themed Android Malware". Empirical Software Engineering (EMSE 2021).

5. Jiayi Hua, **Yuanchun Li**, Haoyu Wang. "MMGuard: Automatically Protecting On-Device Deep Learning Models in Android Apps". The 4th Deep Learning and Security Workshop (DLS 2021), Co-located with S&P 2021.

6. **Yuanchun Li**, Jiayi Hua, Haoyu Wang, Chunyang Chen, Yunxin Liu. "DeepBackdoor: Black-box Backdoor Attack on Deep Learning Models through Neural Payload Injection". In Proceedings of the 2017 IEEE/ACM 39th International Conference on Software Engineering. (ICSE 2021).

7. Bingyan Liu (intern), **Yuanchun Li***, Yao Guo, Xiangqun Chen, Yunxin Liu. "PMC: A Privacy-preserving Deep Learning Model Customization Framework for Edge Computing". Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 4, 4, Article 139 (December 2020), 25 pages. (UbiComp 2021).

8. Ziqi Zhang (intern), **Yuanchun Li***, Yao Guo, Xiangqun Chen, Yunxin Liu. "Dynamic Slicing for Deep Neural Networks." In Proceedings of the 28th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering. Association for Computing Machinery, New York, NY, USA, 838–850. (ESEC/FSE 2020)

9. **Yuanchun Li**, Ziyue Yang*, Yao Guo, Xiangqun Chen. "Humanoid: a deep learning-based approach to automated black-box Android app testing." In Proceedings of the 34th IEEE/ACM International Conference on Automated Software Engineering. IEEE Press, 1070–1073. (ASE 2019 Tool).

10. **Yuanchun Li**, Ziyue Yang, Yao Guo, Xiangqun Chen, Yuvraj Agarwal, and Jason Hong. "Automated Extraction of Personal Knowledge from Smartphone Push Notifications." The IEEE International Conference on Big Data , 733-742. (BigData 2018)

11. Yao Guo, **Yuanchun Li**, Ziyue Yang, and Xiangqun Chen. "What's inside your app?: Understanding Feature Redundancy in Mobile Apps." In Proceedings of the IEEE/ACM International Conference on Program Comprehension, 266-276. (ICPC 2018)

12. Haojian Jin, Minyi Liu, Kevan Dodhia, **Yuanchun Li**, Gaurav Srivastava, Matthew Fredrikson, Yuvraj Agarwal, and Jason I. Hong. 2018. Why Are They Collecting My Data? Inferring the Purposes of Network Traffic in Mobile Apps. Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 2, 4, Article 173 (December 2018), 27 pages. (UbiComp 2020)

13. **Yuanchun Li**, Fanglin Chen, Toby Jia-Jun Li, Yao Guo, Gang Huang, Matthew Fredrikson, Yuvraj Agarwal, and Jason I. Hong. "PrivacyStreams: Enabling Transparency in Personal Data Processing for Mobile Apps." Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 1, 3, Article 76 (September 2017), 26 pages. (UbiComp 2017)

14. **Yuanchun Li**, Baoxiong Jia, Yao Guo, and Xiangqun Chen. "Mining User Reviews for Mobile App Comparisons." Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 1, 3, Article 75 (September 2017), 15 pages. (UbiComp 2017)

15. Haoyu Wang, **Yuanchun Li**, Yao Guo, Yuvraj Agarwal, and Jason I. Hong. "Understanding the Purpose of Permission Use in Mobile Apps." ACM Trans. Inf. Syst. 35, 4, Article 43 (July 2017), 40 pages. (TOIS 2017)

16. **Yuanchun Li**, Ziyue Yang, Yao Guo and Xiangqun Chen. "DroidBot: A Lightweight UI-Guided Test Input Generator For Android." In Proceedings of the 2017 IEEE/ACM 39th International Conference on Software Engineering Companion, 321-326. (ICSE 2017 Tool)

17. Toby Jia-Jun Li, **Yuanchun Li**, Fanglin Chen and Brad A. Myers. "Programming IoT Devices by Demonstration Using Mobile Apps." End-User Development. International Symposium on End User Development, 3-17. (IS-EUD 2017, **Best Paper Award**)

18. **Yuanchun Li**, Yao Guo, and Xiangqun Chen. "PERUIM: Understanding Mobile Application Privacy with Permission-UI Mapping." In Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing, 682-693. (UbiComp 2016, **Best Paper Honorable Mention Award**)

19. **Yuanchun Li**, Yao Guo, Junjun Kong and Xiangqun Chen. "Fixing Sensor-Related Energy Bugs Through Automated Sensing Policy Instrumentation." IEEE/ACM International Symposium on Low Power Electronics and Design, 321-326. (ISLPED 2015)

Open-Source Software

I authored several open-source tools that are popular in my research area.

- DroidBot – A Lightweight UI-Guided Test Input Generator (500+ stars)
  - https://github.com/honeynet/droidbot
- PrivacyStreams – A Library for Easy and Secure Personal Data Processing (200+ stars)
  - https://github.com/PrivacyStreams/PrivacyStreams

Selected Honors, Grants and Awards

National Scholarship	2017
IS-EUD Best Paper Award	2017
Bosch/Bezirk Internet of Things Hackathon - 1st place ($1000)	2016
UbiComp Best Paper Honorable Mention Award	2016
Google Summer of Code ($5500)	2016
Merit Student at Peking University	2016
Google Summer of Code ($5500)	2015

Teaching Experience

Instructor, AI Systems Course	Online course
https://github.com/microsoft/AI-System	
Teaching Assistant, Operating System Labs (honor track)	Fall 2014, Spring 2015

	Fall 2015, Spring 2016
● Teaching Assistant, Compiler Techniques	Spring 2015, Spring 2016
● Teaching Assistant, Introduction to Computer Systems	Fall 2013, Fall 2014
● Mentor, Google Summer of Code	Summer 2015, Summer 2016

Languages and Skills

- Language – Chinese (Mandarin) – Native
- Language – English – Professional working proficiency
- Programming Languages – Python, Java, C++, JavaScript, Scala, SQL, Lisp
- Techniques – Software analysis and verification, reinforcement learning, applied machine learning