

Yuanchun Li

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About Me

I'm an Assistant Professor in Institute for AI Industry Research (AIR), Tsinghua University. My research interests lie in mobile computing and on-device intelligence. In this field, I have published over 50 academic papers in top-tier venues (such as MobiCom, MobiSys, UbiComp, NSDI, ICLR, ICSE, FSE, ACL, WWW, TMC). My work has been cited over 2,000 times on Google Scholar. I have led or played a key role in multiple national research projects, including grants from the National Natural Science Foundation of China (NSFC), National Key R&D Programs, and NSFC Key Projects. My research has been recognized with several academic awards, including the UbiComp Honorable Mention Award, IS-EUD Best Paper Award, GreenCom Outstanding Paper Award, First Prize of the CAA Science and Technology Progress, and the ACM SIGBED China Rising Star Award. The open-source tools and frameworks I have developed, such as DroidBot, PrivacyStreams and AutoDroid, have been widely adopted by the research community. In recent years, with the rapid advancement of large models and AI agents, my research on on-device intelligent agents has gained significant attention and recognition. I have served as the lead author in drafting a national standard and co-authored the AI Phone White Paper of HarmonyOS, providing essential guidance for industry adoption of related technologies.

Education

Ph.D. in Computer Software and Theory, Peking University 2014.09 – 2019.07

- Institute of Software, EECS
- Advisors: Yao Guo, Xiangqun Chen

Visiting Student, Carnegie Mellon University 2016.09 – 2017.09

- Human-Computer Interaction Institute (HCII)
- Advisors: Jason I. Hong, Yuvraj Agarwal

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

- School of Electronics Engineering and Computer Science (EECS)

Professional Experiences

Assistant Professor, Institute for AI Industry Research, Tsinghua University 2021.12 – Present

- Working on mobile AI agents

Researcher/Senior Researcher, Microsoft Research Asia, Beijing, China 2019.07 – 2021.11

- Working on reliability and privacy of AIoT and cloud

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

- Worked on GUI automation and semantic understanding

Peer-Reviewed Conference and Journal Papers

*indicates co-primary and/or corresponding author.

1. Hao Wen, Shizuo Tian, Borislav Pavlov, Wenjie Du, Yixuan Li, Ge Chang, Shanhui Zhao, Jiacheng Liu, Yunxin Liu, Ya-Qin Zhang, **Yuanchun Li***. "AutoDroid-V2: Boosting SLM-based GUI Agents via Code Generation". In Proceedings of the 23rd ACM International Conference on Mobile Systems, Applications, and Services. **(MobiSys 2025, accepted)**
2. Liang Mi, Weijun Wang, Wenming Tu, Qingfeng He, Rui Kong, Xinyu Fang, Yazhu Dong, Yikang Zhang, **Yuanchun Li**, Meng Li, Haipeng Dai, Guihai Chen, Yunxin Liu. "Empower Vision Applications with LoRA LMM". In Proceedings of The 20th ACM European Conference on Computer Systems. **(EuroSys 2025)**
3. Shanhui Zhao, Hao Wen, Wenjie Du, Cheng Liang, Yunxin Liu, Xiaozhou Ye, Ye Ouyang, **Yuanchun Li*** "LLM-Explorer: Towards Efficient and Affordable LLM-based Exploration for Mobile Apps". In Proceedings of the 31th Annual International Conference on Mobile Computing and Networking. **(MobiCom 2025)**
4. Weijun Wang, Liang Mi, Shaowei Cen, Haipeng Dai, **Yuanchun Li**, Xiaoming Fu, and Yunxin Liu. "Region-based Content Enhancement for Efficient Video Analytics at the Edge", accepted to appear in Proceedings of the 22nd USENIX Symposium on Networked Systems Design and Implementation, 2025. **(NSDI 2025)**
5. Rui Kong, **Yuanchun Li***, Qingtian Feng, Weijun Wang, Xiaozhou Ye, Ye Ouyang, Linghe Kong, Yunxin Liu. "SwapMoE: Serving Off-the-shelf MoE-based Large Language Models with Tunable Memory Budget". The 62nd Annual Meeting of the Association for Computational Linguistics **(ACL 2024)**
6. Naiyu Zheng, **Yuanchun Li***, Shiqi Jiang, Yuanzhe Li, Rongchun Yao, Chuchu Dong, Ting Chen, Yubo Yang, Zhimeng Yin, Yunxin Liu. "AdaWiFi: Collaborative WiFi Sensing for Cross-Environment Adaptation." IEEE Transactions on Mobile Computing **(TMC 2024)**
7. Zhang Shaokun, **Li Yuanchun**, Lei Hanwen, Jiang Peng, Li Ding, Guo Yao, Chen Xiangqun. A Mobile Application GUI Fuzz Testing Framework Based on Multimodal Representation. *Journal of Software*, 2024, 35(7): 3162-3179 (JOS 2024, in Chinese).
8. Li Zhang, Shihe Wang, Xianqing Jia, Zhihan Zheng, Yunhe Yan, Longxi Gao, **Yuanchun Li**, Mengwei Xu. "LlamaTouch: A Faithful and Scalable Testbed for Mobile UI Automation Task Evaluation". The ACM Symposium on User Interface Software and Technology **(UIST 2024)**
9. **Yuanchun Li**, Hao Wen, Weijun Wang, Xiangyu Li, Yizhen Yuan, Guohong Liu, Jiacheng Liu, Wenxing Xu, Xiang Wang, Yi Sun, Rui Kong, Yile Wang, Hanfei Geng, Jian Luan, Xuefeng Jin, Zilong Ye, Guanqing Xiong, Fan Zhang, Xiang Li, Mengwei Xu, Zhijun Li, Peng Li, Yang Liu, Ya-Qin Zhang, Yunxin Liu. "Personal LLM Agents: Insights and Survey about the Capability, Efficiency and Security".
10. Jinliang Yuan, Shangguang Wang, Hongyu Li, Daliang Xu, **Yuanchun Li**, Mengwei Xu, Xuanzhe Liu. "Towards Energy-efficient Federated Learning via INT8-based Training on Mobile DSPs". The Web Conference. **(WWW 2024)**
11. Xiangyu Li, **Yuanchun Li**, Yuanzhe Li, Ting Cao, and Yunxin Liu. "FlexNN: Efficient and Adaptive DNN Inference on Memory-Constrained Edge Devices". In Proceedings of the 30th Annual International Conference on Mobile Computing and Networking. **(MobiCom 2024)**
12. Hao Wen, **Yuanchun Li***, Guohong Liu, Shanhui Zhao, Tao Yu, Toby Jia-Jun Li, Shiqi Jiang, Yunhao Liu, Yaqin Zhang, Yunxin Liu. "AutoDroid: LLM-powered Task Automation in Android". In Proceedings of the 30th Annual International Conference On Mobile Computing And Networking. **(MobiCom 2024)**
13. Fucheng Jia, Shiqi Jiang, Ting Cao, Wei Cui, Tianrui Xia, Xu Cao, **Yuanchun Li**, Qipeng Wang, Deyu Zhang, Ju Ren, Yunxin Liu, Lili Qiu, Mao Yang. "Empowering In-Browser Deep Learning Inference on Edge Through Just-In-Time Kernel Optimization". In Proceedings of the 22nd ACM International Conference on Mobile Systems, Applications, and Services. **(MobiSys 2024)**

14. Yuanzhe Li, Shangguang Wang, **Yuanchun Li**, Ao Zhou, Mengwei Xu, Xiao Ma, Yunxin Liu. "Seamless Cross-Edge Service Migration for Real-Time Rendering Applications". IEEE Transactions on Mobile Computing (**TMC**)
15. Yixuan Li, Qirui Yang, Hao Wen, Huiwen Zheng, Weimin Liu, Hui Li, **Yuanchun Li***, Yunxin Liu. "Retrieval-based Battery Degradation Prediction for Battery Energy Storage System Operations". IEEE GreenCom **2023. (Distinguished Paper Award)**
16. Yizhen Yuan, Rui Kong, Shenghao Xie, **Yuanchun Li***, Yunxin Liu. "PatchBackdoor: Backdoor Attack against Deep Neural Networks without Model Modification". ACM Multimedia. (**MM 2023**)
17. Jinrui Zhang, Huan Yang, Ju Ren, Deyu Zhang, Bangwen He, Youngki Lee, Ting Cao, **Yuanchun Li**, Yaoxue Zhang, Yunxin Liu. "HiMoDepth: Efficient Training-free High-resolution On-device Depth Perception". IEEE Transactions on Mobile Computing (**TMC**)
18. Chen Yang, **Yuanchun Li**, Hao Lu, Jinliang Yuan, Qibo Sun, Shangguang Wang, Mengwei Xu. "Testing and Enhancing the Robustness of Federated Learning System against Realistic Data Corruption". (**ISSRE 2023**)
19. Shaokun Zhang, Wu Linna, **Yuanchun Li**, Ziqi Zhang, Hanwei Lei, Ding Li, Yao Guo, Xiangqun Chen. "ReSPlay: Improving Cross-Platform Record-and-Replay with GUI Sequence Matching". (**ISSRE 2023**)
20. Rui Kong, **Yuanchun Li***, Yizhen Yuan, Linghe Kong. "ConvReLU++: Reference-based Lossless Acceleration of Conv-ReLU Operations on Mobile CPU". In Proceedings of the 21st ACM International Conference on Mobile Systems, Applications, and Services. (**MobiSys 2023**)
21. Yuheng Huang, Lei Ma, **Yuanchun Li***. "PatchCensor: Patch Robustness Certification for Transformers via Exhaustive Testing". ACM Transactions on Software Engineering and Methodology. (**TOSEM**)
22. Naiyu Zheng, Ting Chen, Chuchu Dong, Yubo Yang, Yuanzhe Li, Yunxin Liu, **Yuanchun Li**. "Environment-aware Testing for DNN-based Smart-home WiFi Sensing Systems". In Proceedings of the 30th IEEE International Conference on Software Analysis, Evolution and Reengineering. (**SANER 2023**)
23. Zhonghao Pan, Yang Feng, Zhiyuan Li, Yunxin Liu, **Yuanchun Li***. "Understanding the Impact of Quantum Noise on Quantum Programs". In Proceedings of the 30th IEEE International Conference on Software Analysis, Evolution and Reengineering. (**SANER 2023**)
24. Ziqi Zhang, **Yuanchun Li**, Bingyan Liu, Yifeng Cai, Ding Li, Yao Guo, Xiangqun Chen. "FedSlice: Protecting Federated Learning Models from Malicious Participants with Model Slicing". In Proceedings of the 2022 IEEE/ACM 45th International Conference on Software Engineering. (**ICSE 2023**)
25. Jinliang Yuan, Shangguang Wang, Shihe Wang, **Yuanchun Li**, Xiao Ma, Ao Zhou, Mengwei Xu "Privacy as a Resource in Differentially Private Federated Learning". In Proceedings of the 2023 IEEE International Conference on Computer Communications. (**INFOCOM 2023**)
26. Hao Wen, **Yuanchun Li***, Zunshuai Zhang, Shiqi Jiang, Xiaozhou Ye, Ye Ouyang, Yaqin Zhang, Yunxin Liu. "AdaptiveNet: Post-deployment Neural Architecture Adaptation for Diverse Edge Environments". In Proceedings of the 29th Annual International Conference on Mobile Computing And Networking. (**MobiCom 2023**)
27. Jinrui Zhang, Huan Yang, Ju Ren, Deyu Zhang, Bangwen He, Ting Cao, **Yuanchun Li**, Yaoxue Zhang, Yunxin Liu. "MobiDepth: real-time depth estimation using on-device dual cameras". In Proceedings of the 28th Annual International Conference on Mobile Computing And Networking. (**MobiCom 2022**)
28. Jaemin Shin, **Yuanchun Li***, Yunxin Liu, Sung-Ju Lee. "FedBalancer: Data and Pace Control for Efficient Federated Learning on Heterogeneous Clients". The 20th ACM International Conference on Mobile Systems, Applications, and Services (**MobiSys 2022**)
29. Divyam Madaan, Jaehong Yoon, **Yuanchun Li**, Yunxin Liu, Sung Ju Hwang. "Representational Continuity for Unsupervised Continual Learning". International Conference on Learning Representations (**ICLR 2022, Oral**)
30. Ziqi Zhang, **Yuanchun Li***, Jindong Wang, Bingyan Liu, Ding Li, Xiangqun Chen, Yao Guo, Yunxin Liu. "ReMoS: Reducing Defect Inheritance in Transfer Learning via Relevant Model Slicing". In Proceedings

of the 2022 IEEE/ACM 44th International Conference on Software Engineering. **(ICSE 2022)**

31. Bingyan Liu, Yifeng Cai, Ziqi Zhang, **Yuanchun Li**, Leye Wang, Ding Li, Yao Guo, Xiangqun Chen. "DistFL: Distribution-aware Federated Learning for Mobile Scenarios". Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. **(UbiComp 2022)**
32. Shiqi Jiang, Zhiqi Lin, **Yuanchun Li**, Yuanchao Shu, Yunxin Liu. "Flexible High-resolution Object Detection on Edge Devices with Tunable Latency". In Proceedings of the 27th Annual International Conference On Mobile Computing And Networking **(MobiCom 2021)**.
33. Chengxu Yang, **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". In Proceedings of the 29th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering **(ESEC/FSE 2021)**.
34. **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)**.
35. **Yuanchun Li**, Oriana Riva. "Glider: A reinforcement learning approach to extract UI scripts from websites". In Proceedings of the 44th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR '21). Association for Computing Machinery, New York, NY, USA, 1420–1430. **(SIGIR 2021)**.
36. 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)**.
37. **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 2021 IEEE/ACM 43th International Conference on Software Engineering. **(ICSE 2021)**.
38. Bingyan Liu, **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)**.
39. Ziqi Zhang, **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)**.
40. **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)**.
41. **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)**.
42. 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)**.
43. 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)**.
44. **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)**.

45. **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)**.
46. 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)**.
47. **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)**.
48. 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)**.
49. **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, Honorable Mention Award)**.
50. 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 the research areas.

- 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>
- AutoDroid – LLM-based mobile agent (200+ stars)
 - <https://github.com/MobileLLM/AutoDroid>

Selected Honors, Grants and Awards

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| • ACM SIGBED China “Rising Star” Award, 2024 | 2024 |
| • Distinguished Paper Award, GreenCom 2023 | 2023 |
| • 1st Prize of 2023 CAA Science and Technology Progress Award | 2023 |
| • 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 |