Tian (Sophie) XIE

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Education

The Pennsylvania State University, University Park, USA **Aug 2019- Present**

- **Ph.D. Candidate** in Computer Science and Engineering; **Major GPA:** 3.8

School of Computer Science, Wuhan University, Wuhan, China **Sep 2015- Jun 2019**

- Bachelor of Science in Software Engineering; **Major GPA:** 3.87 /4.0 (Ranked 1st)

Exchange Student: **University of Cambridge**, U.K. **Jul 2016- Sep 2016**
University of California, Berkeley, USA **Aug 2018- Dec 2018**

Technical Skills

Languages: **Python, MATLAB**, C++, C#, R, SQL, Shell, Java
OS: **Linux**, Android, iOS
Tools: **Mininet, SDN**, Docker, Git, Jenkins, **TensorFlow, Keras, Pytorch, SciPy**, NumPy, Scikit-learn

Industrial Experience

Software Engineer Intern | Horizontal Wireline Services, Irwin, PA, USA **Apr 2023- Sep 2023**

- 2509 lines Designed the first automatic **software** for casing collar locator (CCL) detection and matching in gas and oil industry field, with **Python/Node-RED and QT framework**. Adapted new LabJack T7 hardware for more accurate acquisition system, enable **2000 scans/second on streaming channels**, adding GUI with **tkinter**, tested up to 30,000ft in the gas well. (Mentor: Manuel Avitia)

Data Scientist Intern | Citibank., Shanghai, China **Aug 2018- Dec 2018**

- 633 lines Crawled 400k+ user behaviors data, mainly used LDA and FudanNLP in **Python and Java**. Constructed evaluation model by K-means, LSTM and PCA to get investment influence value (speed up the algorithm by 40%).

Product Manager Intern | Tencent Inc., Shenzhen, China **Aug 2017- Dec 2017**

- 1482 lines Produced mobile game 'Gravity' using Unity3D in **C# with EasyTouch, rayCast and NGUI** to accelerate game engine, ranked 1st amongst 60 teams.

Research Experience

Research Assistant | **Penn State University**, PA, USA **Aug 2019- Present**
Advisor: Ting He, Associate Professor, Electrical Engineering and Computer Science

- Comprehensive Host-Based Inference and Matching of Flow Table Sizes in SDN: developed algorithms that accurately infer and match flow table sizes to all the switches in the topology using **Python/C++**, addressing the lack of an inferable relationship between RTTs and flow table hits/misses, and validating its efficacy through experiments with **PICA8**. (Accepted by GLOBECOM'23 and currently undergoing revision for IEEE TNSE)
  3195 lines *Available at: https://github.com/SophieCXT/Flow-Table--Adversarial-Inference-RTT*
- Adversarial reconnaissance and resilience analysis in SDN: used **C++/Python** to develop an adaptive scheme based on the perceived level of attack, and conducted TTL approx. on ad hoc eviction policies, supporting our intelligent attack strategy. (Accepted by INFOCOM'21 and 2 IEEE/ACM ToN, top-tier publication in Network)
  7611 lines *Available at: https://github.com/SophieCXT/Code-and-Data-for-Experiments-in-Mininet*
  https://github.com/SophieCXT/SDN-Implementation-in-Open-vSwitch
- Joint caching and routing with any topology: developed poly-time algorithms with approx. guarantees to minimize total cost, NP-hard problem solved in **Matlab**. (Accepted by ICDCS'22 and IEEE/ACM ToN, top-tier publication)
  2864 lines *Available at: https://github.com/SophieCXT/Joint-caching-and-routing-with-any-topology*

Research Assistant | **Wuhan University**, Wuhan, China **Feb 2016- Jun 2019**

- Pattern Recognition Project: implemented a chat robot in **Python/MySQL/NLP**, a Q&A system adapted in course.
- Accurate Advertisement Recommendation System: implemented a BP neural network to provide optimal Ads under quantized consumption levels with **TensorFlow/Pytorch/Scikit-learn**.

Awards & Advocacy

Silver Prize in 8th China **International 'Internet+'** Innovation and Entrepreneurship Competition **Jun 2023**

- Won **Outstanding Performance Award** with project: GuangYi Biotechnology—Strongest Assists of Anti COVID-19 with Innovative Antibody Testing Using "Quantum Dot – Peptide"

IEEE ICDCS 2022 Travel Grant Award **Aug 2022**

IEEE INFOCOM 2021 NSF Student Conference Award **Jun 2021**

Top 10 Outstanding Students of the Year 2018 of WHU **(top 0.018%)** **2019**

National Champion in Health Qigong Forms **2017, 2018, 2019**

Volunteer Counselor | CSE Camp for Girls & Girls Who Code, Penn State University **Feb 2022- Present**

- Mentored discussion/coding in **Python** and **C#.** Instructed simple **Android-based VR & AR** programming in **Unity 3D** (play with VR glasses: demos & 3D drawing)

Minister | Sunners Union of Helping Left-behind Children, WHU **Apr 2016- Jul 2018**

- Accompanied migrant children in the community on weekly activities with other volunteers recruited on campus
- Established and managed the entire studio (500+), assigned tasks to all departments, and tracked attendance
- Volunteered as Teacher at Fangguo Primary School, Guo Maoling Village in 2017

Publications

1. **Tian Xie**, Ting He, Patrick McDaniel, Namitha Nambiar. Attack Resilience of Cache Replacement Policies. IEEE International Conference on Computer Communications 2021 (INFOCOM), Virtual.
2. Yu, M., **Xie, T.,** He, T., McDaniel, P., & Burke, Q. K. (2021). Flow Table Security in SDN: Adversarial Reconnaissance and Intelligent Attacks. IEEE/ACM Transactions on Networking, 29(6), 2793-2806.
3. **Tian Xie**, Sanchal Thakkar, Ting He, Patrick McDaniel, and Quinn Burke. Attack Resilience of Cache Replacement Policies. IEEE International Conference on Distributed Computing Systems 2022 (ICDCS), Bologna, Italy.
4. **Xie, T.,** Nambiar, N., He, T., & McDaniel, P. (2022). Attack Resilience of Cache Replacement Policies: A Study Based on TTL Approximation. IEEE/ACM Transactions on Networking (ToN).
5. **Xie, T.**, Thakkar, S., He, T., McDaniel, P., & Burke, Q. (2023). Joint caching and routing in cache networks with arbitrary topology. IEEE Transactions on Parallel and Distributed Systems.
6. **Xie, T.,** Thakkar, S., He, T., Bartolini, N., & McDaniel, P. Host-based Flow Table Size Inference in Multi-hop SDN. IEEE Global Communications Conference 2023 (GLOBECOM), Kuala Lumpur, Malaysia
7. **Xie, T.,** Thakkar, S., He, T., Bartolini, N., & McDaniel, P. (submitted) Comprehensive Host-Based Inference and Matching of Flow Table Sizes in SDN. IEEE Transactions on Network Science and Engineering.