Zhiying Xu

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Education

Harvard University — Cambridge, MA
Ph.D. in Computer Science, Advisor: Minlan Yu — Sept 2018 — Current

Shanghai Jiao Tong University — Shanghai, China
B.S. in Information Engineering, GPA: 3.85/4.00 — Sept 2014 — June 2018

Work Experience

Google — Sunnyvale, CA
Software Engineering Intern, Host: Tae Jun Ham — Summer 2023

- Work on accurate application productivity metrics for heterogeneous workloads
- Leverage genetic algorithms to extract key features with little correlation from application event logs
- Build an interpretable regression model on key features that normalizes heterogeneous workloads for productivity comparison

Microsoft Research — Redmond, WA
Research Intern, Host: Francis Y. Yan — Summer 2022

- Work on scalable traffic engineering in large wide-area networks
- Model traffic engineering with neural network inference to unlock massive parallelism on GPUs
- Enforce capacity constraints on the neural networks' coarse solution using parallelizable ADMM
- Accepted in SIGCOMM'23

Research Experience

Scalable Resource Allocation using Learning-augmented ADMM — April 2022 –Current

- Work on a scalable learning-augmented solution for resource allocation problems
- Decouple resource constraints and request constraints through two-block ADMM
- Accelerate high-dimension Euclidean projections in ADMM iterations by learning projection mappings

Boosting DDoS Detection Systems using Auxiliary Signal — Oct 2020 –Sept 2022

- Work on early detection of DDoS attacks on Internet service providers
- Identify auxiliary signals before attacks, e.g. the presence of spoofed traffic or blocklisted sources, etc.
- Leverage survival analysis on LSTM to learn when weak auxiliary signals represent an imminent attack
- Accepted in CoNEXT'22

Automating Botnet Detection with Graph Neural Networks — Sept 2018 –June 2022

- Work on accurate botnet detection from massive network traffic
- Leverage the fast-mixing structure for botnets in the snapshot of network traffic topology
- Tailor graph neural networks on a transformer to identify botnet structures spatially and temporally
- Partial results accepted in AutoML Workshop of MLSys'20; Dataset with 7.4k downloads

Publications

[1] **Zhiying Xu**, Francis Yan, Rachee Singh, Justin Chiu, Alexander Rush, and Minlan Yu. "Teal: Learning-Accelerated Optimization of WAN Traffic Engineering". In: *SIGCOMM*. ACM, 2023.

[2] Jiawei Zhou, Woojeong Kim, **Zhiying Xu**, Alexander Rush, and Minlan Yu. "NetFlowGPT: Modeling Network Dynamics by Generative Traffic Pre-training". In: under submission.

[3] **Zhiying Xu**, Sivaramakrishnan Ramanathan, Alexander Rush, Jelena Mirkovic, and Minlan Yu. "Xatu: Boosting Existing DDoS Detection Systems Using Auxiliary Signals". In: *CoNEXT*. ACM, 2022.

[4] Jiawei Zhou*, **Zhiying Xu***, Alexander Rush, and Minlan Yu. "Automating Botnet Detection with Graph Neural Networks". In: *AutoML Workshop of MLSys Conference*. ACM, 2020.

[5] Luoyi Fu, Jiasheng Xu, Shan Qu, **Zhiying Xu**, Xinbing Wang, and Guihai Chen. "Seeking the Truth in a Decentralized Manner". In: *Transactions on Networking*. IEEE/ACM, 2021.

[6] Luoyi Fu, Xinzhe Fu, Zesen Zhang, **Zhiying Xu**, Xudong Wu, Xinbing Wang, and Songwu Lu. "Joint Optimization of Multicast Energy in Delay-constrained Mobile Wireless Networks". In: *Transactions on Networking*. IEEE/ACM, 2018.

[7] Xinzhe Fu, **Zhiying Xu**, Qianyang Peng, Jie You, Luoyi Fu, Xinbing Wang, and Songwu Lu. "ConMap: A Novel Framework for Optimizing Multicast Energy in Delay-constrained Mobile Wireless Networks". In: *ACM MobiHoc*. ACM, 2017.

[8] Xinzhe Fu, **Zhiying Xu**, Qianyang Peng, Luoyi Fu, and Xinbing Wang. "Complexity vs. Optimality: Unraveling Source-destination Connection in Uncertain Graphs". In: *INFOCOM*. IEEE, 2017.

[9] Luoyi Fu, Xinzhe Fu, **Zhiying Xu**, Qianyang Peng, Xinbing Wang, and Songwu Lu. "Determining Source–destination Connectivity in Uncertain Networks: Modeling and Solutions". In: *Transactions on Networking*. IEEE/ACM, 2017.

[10] Xinzhe Fu, Zhongzhao Hu, **Zhiying Xu**, Luoyi Fu, and Xinbing Wang. "De-anonymization of Networks with Communities: When Quantifications Meet Algorithms". In: *GLOBECOM*. IEEE, 2017.

Patent

- **Proactive DDoS Detection with Auxiliary Signals** 2021
  U.S. Provisional Application No. 63/183,096
  Sivaramakrishnan Ramanathan, Zhiying Xu and Minlan Yu

Skills

- **Programming:** Python, C/C++, Verilog, VHDL
- **Tools:** Pytorch, CUDA, FPGA, Cortex-M, MATLAB, LaTeX

Teaching Experience

- **Teaching Assistant** at Harvard University Spring 2020
  Computing Foundations for Computational Science
- **Teaching Assistant** at Harvard University Fall 2022
  Advanced Computer Networks

Awards

- Harvard Student Recognition of Teaching 2022
- Outstanding Graduates in Shanghai 2018
- National Scholarship(top 0.2%, nationwide) 2015, 2017