Caitao Zhan

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About Me

I now work in `quantum` networking/computing/sensing. Previously I work in `classical` networking/computing/sensing.

Education

Aug. 2017 ~ Jan. 2024	Stony Brook University GPA: 3.9/4.0	Ph.D. Candidate in Computer Science Advisor: Himanshu Gupta, Thesis
Sept. 2013 ~ Jun. 2017	China University of Geosciences GPA: 92/100	B.S. in Computer Science and Technology Rank: 1/122

Employment

Feb. 2024 ~ Present	Postdoc @ Argonne National Lab (Data Science and Learning Division) Quantum networks, SeQUeNCe, Quantum Internet architecture
May 2021 ~ Aug. 2021	Software Engineering Intern @ Microsoft (Azure) `C#` development: Active Directory/Light-weight Directory Service (AD/LDS) Replay Tool Automation
Jun. 2018 ~ Jan. 2024	Research assistant @ Stony Brook University Wireless sensor networks, data center networks, quantum networks, and quantum sensor networks
Sep. 2017 ~ May 2018	Teaching assistant @ Stony Brook University

Research Experience

Feb. 2024 ~ Present	Adaptive continuous entanglement generation, QKD, SeQUeNCe development
Jan. 2021 ~ Jan. 2024	Efficient Quantum Communication Networks. [8, 13] Design/implement routing algorithms/protocols for quantum networks. Bell states, GHZ, Graph states.
Sep. 2021 ~ Jan. 2024	Discrete Outcome Quantum Sensor Networks. [9, 12] Quantum state/channel discrimination, initial state optimization, semidefinite programming, theory.
Aug. 2022 ~ Sep. 2023	Quantum Sensor Network Algorithms for Transmitter Localization. [10] Quantum sensing, quantum state discrimination, quantum machine learning
Nov. 2019 ~ Mar. 2022	Intelligent Radio with Deep Learning. [5, 7, 11] Design/implement CNNs to solve wireless network problems: wireless localization & spectrum allocation. Reframe wireless problems to computer vision problems: image-to-image translation & object detection.
Mar. 2019 ~ Oct. 2019	Efficient Localization of Multiple Intruders in Shared Spectrum System. [3] Design/implement. Bayesian approach. Testbed(Odroid,Raspberry Pi,USRP,HackRF).
Dec 2018 ~ Sep. 2020	Datacenter Networks. [4] Multi-hop circuit switch scheduling. Greedy, approximation proof. Participate in implementation.
July 2018 ~ July 2019	Selection of Sensors for Efficient Transmitter Localization. [2, 6] Implement. Greedy, approximation proof. Bayesian approach. GPU acceleration.
Oct. 2015 ~ Sept. 2016	Optimization using Evolutionary Algorithms. [1] Design/implement. Shortest path-finding using ant colony optimization algorithms. Proposed a probability-based evolutionary algorithm solving shape formation problems.

Skills & Tools

`Python` and **`C++`** are my most frequently used languages. I also have experience in **`C#`**, **`Java`**, **`C`**, and **`Matlab`**. Machine learning: **`PyTorch`**, **`scikit-learn`**, and **`ML.NET`**. Quantum: quantum network simulator **`NetSquid`**, quantum development SDK **`Qiskit`**, and quantum machine learning library **`TorchQuantum`**. GPU programming: **`CUDA`** and **`Numba`**. Software-defined radio: **`GNU Radio`**. Database: **`MySQL`** and **`SQLite`**. Convex optimization: **`OR-Tools`** and **`CVXPY`**.

Selected Awards and Honors

China National Scholarship	2014, Chinese Ministry of Education, Top 1%
2nd Prize in Freshman ACM ICPC Cup	2014, China University of Geosciences, Top 6%
Travel Grant for ACM IMC	2018, ACM Internet Measurement Conference
Best Poster Award (Participants Choice) in Graduate Research Day	2022, Department of CS, Stony Brook University

Academic Services

Artifact Evaluation Committee of ACM MobiCom 2023
Shadow Program Committee of ACM SenSys 2022
Reviewer of Elsevier The Journal of Networks and Computer Applications, Elsevier Pervasive and Mobile Computing, IEEE/ACM Transactions on Networking, IEEE Internet of Things Journal, IEEE Open Journal of the Communications Society.

Mentorship Experience

Xiaojie Fan (Stony Brook U.), Sagar Patange (U. Chicago), Laura Davossa and Francesco Mazza (U. of Naples Federico II)

Unpublished

[13] X. Fan, **C. Zhan**, H. Gupta, C.R. Ramakrishnan, "Optimized Distribution of Entanglement Graph States in Quantum Networks". arXiv

Publication

[12] **C. Zhan**, H. Gupta, M. Hillery, "Optimizing Initial State of Detector Sensors in Quantum Sensor Networks". ACM Transactions on Quantum Computing (TQC), PDF

[11] M. Ghaderibaneh, **C. Zhan**, H. Gupta, "DeepAlloc: CNN-Based Approach to Efficient Spectrum Allocation in Shared Spectrum Systems". IEEE Access 2024, PDF

[10] **C. Zhan**, H. Gupta, "Quantum Sensor Network Algorithms for Transmitter Localization". IEEE Quantum Computing and Engineering (QCE) 2023, PDF.

[9] M. Hillery, H. Gupta, **C. Zhan**, "Discrete Outcome Quantum Sensor Networks". Physical Review A (PRA), PDF.

[8] M. Ghaderibaneh, **C. Zhan**, C.R. Ramakrishnan, H. Gupta, "Efficient Quantum Network Communication using Optimized Entanglement-Swapping Trees", IEEE Transactions on Quantum Engineering (TQE) 2022. PDF.

[7] **C. Zhan**, M. Ghaderibaneh, P. Sahu, H. Gupta, "DeepMTL Pro: Deep Learning Based Multiple Transmitter Localization and Power Estimation", Elsevier Pervasive and Mobile Computing (PMC) 2022. PDF.

[6] A. Bhattacharya, **C. Zhan**, A. Maji, H. Gupta, S. Das, P. Djuric, "Selection of Sensors for Efficient Transmitter Localization", IEEE/ACM Transactions on Networking (TON) 2021. PDF.

[5] **C. Zhan**, M. Ghaderibaneh, P. Sahu, H. Gupta, "DeepMTL: Deep Learning Based Multiple Transmitter Localization", IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM) 2021. PDF.

[4] H. Gupta, M. Curran, **C. Zhan**, "Near-Optimal Multihop Scheduling in General Circuit-Switched Networks", ACM International Conference on emerging Networking EXperiments and Technologies (CoNEXT) 2020. PDF.

[3] **C. Zhan**, H. Gupta, A. Bhattacharya, M. Ghaderibaneh, "Efficient Localization of Multiple Intruders in Shared Spectrum System", ACM/IEEE Information Processing in Sensor Networks (IPSN) 2020. PDF.

[2] A. Bhattacharya, **C. Zhan**, H. Gupta, S. Das, P. Djuric, "Selection of Sensors for Efficient Transmitter Localization", IEEE International Conference on Computer Communications (INFOCOM) 2020. PDF.

[1] **C. Zhan** and C. Li, "Shape Formation in Games: a Probability-based Evolutionary Approach", 2016 International Conference on Computational Intelligence and Security. PDF.