Caitao Zhan

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About Me

I am a computer scientist who works in both `classical` networks and `quantum` networks. My expertise lies in wireless sensor networks, machine learning for wireless sensing, and quantum networks/sensing/computing.

Education

Aug. 2017 ~ present	Stony Brook University GPA: 3.9/4.0	Ph.D. Candidate in Computer Science. Advisor: `Himanshu Gupta`
Aug. 2017 ~ Aug. 2022	Stony Brook University	M.S. in Computer Science
Sept. 2013 ~ Jun. 2017	China University of Geosciences GPA: 92/100	B.S. in Computer Science and Technology Rank: 1/122

Intern Experience

May. 2021 ~ Aug. 2021	Software Engineering Intern @ Microsoft (Azure) `C#` development: Active Directory/Light-weight Directory Service (AD/LDS) Replay Tool Automation. Design/implement AutoQuery, which stresses the AD/LDS server automatically and intelligently.

Research Experience

Aug. 2022 ~ present	Quantum Sensor Network Algorithms for Transmitter Localization. [10] Quantum sensing, quantum state discrimination, hybrid quantum-classical algorithms
Sep. 2021 ~ present	Discrete Outcome Quantum Sensor Networks. [9, 12] Quantum state/channel discrimination, initial state optimization, semidefinite programming, theory.
Jan. 2021 ~ present	Efficient Quantum Communication Networks. [8] Design/implement routing algorithms/protocols for quantum networks using entanglement-swapping trees.
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.
Otc. 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` are **`C++`** are my most frequently used languages. I also have experience in **`C#`**, **`Java`**, **`C`**, and **`Matlab`**. For machine learning, have experience in **`PyTorch`**, **`scikit-learn`**, and **`ML.NET`**. For quantum, have experience in quantum network simulator **`NetSquid`** and quantum development SDK **`Qiskit`**, and quantum machine learning library **`TorchQuantum`**. For GPU programming, have experience in **`CUDA`** and **`Numba`**. For software-defined radio, have experience in **`GNU Radio`**. For database, have experience in **`MySQL`** and **`SQLite`**. For convex optimization, have experience in **`OR-Tools`** and **`CVXPY`**.

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

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

Preprint

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

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

Publication

[10] **C. Zhan**, H. Gupta, "Quantum Sensor Network Algorithms for Transmitter Localization". To appear at 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, Presentation.

[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, Presentation.

[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, Presentation.

[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, Presentation.

[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, Presentation.

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