

Qing An

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EDUCATION

Rice University (Wireless Group)

Doctor of Philosophy in Electrical and Computer Engineering, GPA 3.76

Houston, TX

Sept. 2020 – Present

University of Michigan

Master of Science in Electrical and Computer Engineering, GPA 3.87

Ann Arbor, MI

Sept. 2018 – May 2020

Dalian University of Technology

Bachelor of Engineering in Electrical and Computer Engineering, GPA 3.95 (ranking: 1 / 117) Sept. 2014 – Jun. 2018

Dalian, China

INTERNSHIP

Deep Reinforcement Learning-Based MIMO Layer and MCS Selection in Open RAN 5G Networks

Mavenir Systems, May 2024 - Aug. 2024

- Collect channel dataset with Matlab 5G toolbox.
- Design an action branching D3QN-based MCS and layer selection mechanism for SU/MU-MIMO networks.
- Deployment in Distributed Unit of Open RAN framework.
- Evaluate the performance of proposed design in a 32 x 4 SU/MU-MIMO network, demonstrating a 18% improvement in throughput compared to SOTA designs.
- Submit a paper to ACM MobiCom Workshop

RESEARCH EXPERIENCE & PUBLICATIONS

Helix: A RAN Slicing Based Scheduling Framework for Massive MIMO Networks

International Conference on Emerging Networking EXperiments and Technologies (ACM CoNEXT), Jun. 2024

- Design a channel-aware and Service-Level-Agreement-aware RAN slicing framework for massive MIMO networks.
- Evaluate the performance with the dataset collected on a real-world MIMO testbeds in various scenarios.
- Proposed design saves 60.9% resource blocks compared to SOTA work while meeting 5G sub-millisecond-level latency requirement.

DRAGON: A DRL-based MIMO Layer and MCS Adapter in Open RAN 5G Networks

Under Review for ACM MobiCom Workshop, Sep. 2024

- Design a real-time DRL-based layer number and MCS selection mechanism in MIMO networks under O-RAN framework.
- Adopt action branching architecture to efficiently manage the high-dimensional task of layer-MCS prediction.
- Conduct an exhaustive evaluation using a realistic dataset to demonstrate its effectiveness over SOTA work and integrate with a real-world O-RAN-based MIMO platform to validate its practical applicability.

A Deep Reinforcement Learning-Based Resource Scheduler for Massive MIMO Networks

IEEE Transactions on Machine Learning in Communications and Networking, Sept. 2023

- Propose a DRL-based scalable resource scheduler for single-cell massive multi-user MIMO networks.
- Combine Soft-Actor-Critic and K-Nearest Neighbors to solve action dimension disaster in user selection problem.
- Conduct a comprehensive evaluation on various scales of networks by comparing with heuristics and other SOTA RL-based (e.g. DQN, DDPG and Point Network) methods.

Machine Learning-Based Feedback-Free Adaptive MCS Selection for Massive MIMO Networks

IEEE Asilomar Conference on Signals, Systems and Computers, Nov. 2023

- Design a CNN-LSTM based MCS predictor which uses uplink estimated channel matrix to predict MCS for downlink transmission to remove periodic CQI feedback overhead.
- Collect multi-user MIMO dataset from over-the-air experiments and simulations.
- Conduct sufficient evaluations by comparing with other heuristic and ML-based adaptive MCS designs.

AWARDS AND PROFESSIONAL SERVICES

National Scholarship

Sept. 2015 & Sept. 2016

- Ranked #1 out of 135 students in the Electrical and Computer Engineering

POWDER-RENEW Mobile and Wireless Week (SLC, Utah)

Dec. 2023

- Mini-project 1st prize: ML-based adaptive modulation selection for MIMO networks

Invited Reviewer

- IEEE Transactions on Vehicular Technology

SKILLS & INTERESTS

Coding Skills: Python, C++, Matlab, Pytorch, Tensorflow, Git and Docker.

Wireless Tools: QuaDriGa channel simulator, srsRAN, OpenAirInterface (OAI), Matlab 5G toolbox and SDR.

Interests: Self-motivated Ph.D. student in ECE seeking a Wireless and AI/ML scientist/software engineer position.