HAOYANG HU

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EDUCATION

ShanghaiTech University *Shanghai, P.R.China*
M.S. Candidate in Communication and Information Systems *Sept. 2021 - Jun. 2024 (Expected)*
GPA (Overall): 3.94/4.0, GPA (Major): 4.0/4.0, Advisors: Prof. Youlong Wu and Prof. Ning Cai

University of Electronic Science and Technology of China *Chengdu, Sichuan, P.R.China*
B.E. in Earth Information Science and Technology *Sept. 2017 - Jun. 2021*
GPA: 3.98/4.0 (91.89/100)

RESEARCH INTERESTS

Information Theory, Coded Computation, Wireless Communication, Machine Learning

PUBLICATIONS

Journal Articles

[J1] **H. Hu**, Y. Wu, Y. Shi, S. Li, C. Jiang, and W. Zhang, *"Communication-Efficient Coded Computing for Distributed Multi-Task Learning"*, IEEE Transactions on Communications, vol. 71, no. 7, pp. 3861–3875, 2023. [Paper]

Conference Papers

[C1] **H. Hu**, S. Li, M. Cheng, and Y. Wu, *"Coded Distributed Computing for Hierarchical Multi-Task Learning"*, in IEEE Information Theory Workshop (ITW), 2023, pp. 480–485.[Paper]

[C2] H. Tang, **H. Hu**, K. Yuan and Y. Wu, *"Communication-Efficient Coded Distributed Multi-Task Learning"*, in IEEE Global Communications Conference (GLOBECOM), 2021, pp. 1-6. [Paper]

Manuscripts

[I1] **H. Hu**, S. Li, M. Cheng, S. Ma, Y. Shi, and Y. Wu, *"On Exploiting Network Topology for Hierarchical Coded Multi-task Learning"*, submitted to IEEE Transactions on Communications, 2023.

[I2] Y. Wu, **H. Hu**, C. Li, H. Tu, and S. Ma, *"Coded Distributed Computing for Multi-cluster Distributed Computations"*, in preparation, 2023.

RESEARCH EXPERIENCE

Project: Coded Computation for Multi-cluster Distributed Computations May 2023 - Oct. 2023
Research Assistant, work with Prof. Youlong Wu

- Proposed Nested CDC scheme that significantly reduces communication costs by collaboratively exploiting coded opportunities in both inner-cluster and cross-cluster communications.
- Extended Nested CDC scheme to the heterogeneous scenario where both the numbers of workers and the storage capability of workers in different clusters can be different. Established the theoretic trade-off between the computation load, inner-cluster communication load, and cross-cluster communication load. **[I2]**

Project: Coded Computation for Hierarchical Multi-Task Learning Systems Apr. 2022 - Sep. 2022
Research Assistant, work with Profs. Youlong Wu and Songze Li (Southeast University)

- Proposed coded computing techniques to reduce the communication loads for hierarchical multi-task learning systems via jointly exploiting the network topology and relays' computing capability. **[C1]**
- Derived information-theoretic lower bounds on the uplink and downlink communication loads. **[I1]**

Project: Communication-Efficient Coded Distributed Multi-Task Learning Mar. 2021 - Dec. 2021
Research Assistant, work with Profs. Youlong Wu, Songze Li (Southeast University), Yuanming Shi (Shanghaitech University)

- Proposed communication-efficient coded multi-task learning schemes to reduce the uplink and downlink communication loads in the distributed multi-task learning setting. **[C2]**
- Established a theoretic trade-off between the uplink communication load, downlink communication load, and computation load for flexible and fixed data placements. Provided information-theoretic lower bounds on the uplink and downlink communication. **[J1]**

TEACHING EXPERIENCE

Teaching Assistant at ShanghaiTech University

- EE142: Fundamentals of Information Theory (Outstanding Teaching Assistant, Top 20%) *Spring, 2022*
- CS282: Machine Learning *Fall, 2022*

AWARDS AND HONORS

Merit Student (Top 5%) *ShanghaiTech University, 2022*
Outstanding Graduates in Sichuan Province *Ministry of Education in Sichuan Province, 2021*
China National Scholarship (Top 0.2 % Nationwide) *Ministry of Education in China, 2020*
Gratitude to Chinese Modern Scientists Scholarship 2020
First-class Scholarship *University of Electronic Science and Technology of China, 2018 ∼ 2020*
First Prize of China Undergraduate Mathematical Contest in Modeling *2019*
Shiqiang Scholarship *2019*
Wuliangye Scholarship *2018*

TECHNICAL STRENGTHS

Programming Languages: Python, MATLAB, C/C++
Technical Skills: CVX, PyTorch, Git, Latex
English Proficiency: TOEFL 104 (Reading 29, Listening 29, Speaking 22, Writing 24), GRE 322 (AW: 3.5)