HAOYANG HU

393 Middle Huaxia Road, Pudong New Area, Shanghai, P.R. China, 201210

Email: huhy@shanghaitech.edu.cn ⋄ Personal Website: haoyang-hu.github.io

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, Machine Learning, Wireless Communication, Coded Computation

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 (Major Revision).

[I2] Y. Wu, **H. Hu**, C. Li, H. Tu, and S. Ma, *"Coded Distributed Computing for Multi-cluster Distributed Computations"*, submitted to IEEE Transactions on Communications, 2023 (Major Revision).

RESEARCH EXPERIENCE

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

- Proposed Nested coded distributed computing scheme that significantly reduces communication costs by collaboratively exploiting coded opportunities in both inner-cluster and cross-cluster communications.

- Extended Nested coded distributed computing 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, 2022,2023*
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)