Kai Yang

Shanghai Institute of Microsystem and Information Technology, University of Chinese Academy of Sciences

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Education

Shanghai Institute of Microsystem and Information Technology, Shanghai, China & **University of Chinese Academy of Sciences**, Beijing, China
Ph.D. in Communication and Information Systems, 09/2017-07/2020

- Advisor: Prof. Yuanming Shi
- Research Topic: Sparse and Low-Rank Optimization for Mobile Edge Artificial Intelligence

Dalian University of Technology, Dalian, China
B.E. in Electronic Engineering, 09/2011–07/2015

- Advisor: Prof. Yanqing Guo
- School of Information and Communication Engineering 09/2013-07/2015
- Faculty of Electronic Information and Electrical Engineering 09/2011-07/2013

Honors and Awards

- Outstanding Graduates of ShanghaiTech University, 2020
- National Scholarship for Graduate Students, 2017
- Student Merit Award, University of Chinese Academy of Science, 2017
- Student Merit Award, ShanghaiTech University, 2016

Experience

University of Toronto, Ontario, Canada
Visiting student, 01/2019-12/2019

- Host: Prof. Wei Yu

WeBank, Shenzhen, China
Intern in FATE group of WebankFinTech team, 07/2019-09/2019

University of California, Berkeley, California, USA
Visiting student in BeSTEC program, 10/2016-02/2017

- Host: Prof. Martin J. Wainwright

Research Interests

My research focuses on designing efficient systems and optimization algorithms for wireless communication, distributed computing, machine learning, and federated learning in particular.

Publications

Book Chapters

1. Y. Shi, **K. Yang**, and Y. Yang, "Generalized Low-Rank Optimization for Ultra-Dense Fog-RANs," in *Ultra Dense Networks: Principles and Technologies*, Cambridge University Press, 2019.

Survey and Magzine Papers

1. Y. Shi, **K. Yang**, T. Jiang, J. Zhang, and K. B. Letaief, "Communication-efficient edge AI: algorithms and systems," *IEEE Commun. Surveys Tuts.*

2. **K. Yang**, Y. Shi, Y. Zhou, Z. Yang, L. Fu, and W. Chen, "Federated machine learning for intelligent IoT via reconfigurable intelligent surface," *IEEE Netw.*

3. **K. Yang**, Y. Zhou, Z. Yang, and Y. Shi, "Communication-efficient edge AI inference over wireless networks," *ZTE Commun.*

Journal Articles

1. **K. Yang**, Y. Shi, W. Yu, and Z. Ding, "Energy-efficient processing and robust wireless cooperative transmission for edge inference," *IEEE Internet Things J.*

2. **K. Yang**, T. Jiang, Y. Shi, and Z. Ding, "Federated learning via over-the-air computation," *IEEE Trans. Wireless Commun.*, vol. 19, no. 3, pp. 2022-2035, Mar. 2020.

3. **K. Yang**, Y. Shi, and Z. Ding, "Data shuffling in wireless distributed computing via low-rank optimization," *IEEE Trans. Signal Process.*, vol. 67, no. 12, pp. 3087-3099, Jun. 2019.

4. **K. Yang**, Y. Shi, and Z. Ding, "Generalized low-rank optimization for topological cooperation in ultra-dense networks," *IEEE Trans. Wireless Commun.*, vol. 18, no. 5, pp. 2539-2552, May 2019.

5. J. Dong, **K. Yang**, and Y. Shi, "Ranking from crowdsourced pairwise comparisons via smoothed Riemannian optimization," submitted.

6. J. Dong, **K. Yang**, and Y. Shi, "Blind demixing for low-latency communication," in *IEEE Trans. Wireless Commun.*, vol. 18, no. 2, pp. 897-911, Feb. 2019.

Conference Papers

1. **K. Yang**, T. Jiang, Y. Shi, and Z. Ding, "Federated learning based on over-the-air computation," in *Proc. IEEE Int. Conf. Commun. (ICC)*, Shanghai, China, May 2019.

2. T. Jiang, **K. Yang**, and Y. Shi, "Pliable data shuffling for on-device distributed learning," in *Proc. IEEE Int. Conf. Acoust. Speech Signal Process. (ICASSP)*, Brighton, UK, May 2019.

3. **K. Yang**, Y. Shi, and Z. Ding, "Low-rank optimization for data shuffling in wireless distributed computing," in *Proc. IEEE Int. Conf. Acoust. Speech Signal Process. (ICASSP)*, Alberta, Canada, Apr. 2018.

4. J. Dong, **K. Yang**, and Y. Shi, "Blind demixing for low-latency communication," in *Proc. IEEE Wireless Commun. Networking Conf. (WCNC)*, Barcelona, Spain, Apr. 2018.

5. **K. Yang**, Y. Shi, and Z. Ding, "Generalized matrix completion for low complexity transceiver processing in cache-aided Fog-RAN via the Burer-Monteiro approach," in *Proc. IEEE Global Conf. Signal and Inf. Process. (GlobalSIP)*, Montreal, Canada, Nov. 2017.

6. J. Dong, **K. Yang**, and Y. Shi, "Ranking from crowdsourced pairwise comparisons via smoothed matrix manifold optimization," in *ICDM Workshops on Data-driven Discovery of Models (D3M)*, New Orleans, Louisiana, USA, Nov. 2017.

7. **K. Yang**, Y. Shi, J. Zhang, Z. Ding and K. B. Letaief, "A low-rank approach for interference management in dense wireless networks," in *Proc. IEEE Global Conf. Signal and Inf. Process.(GlobalSIP)*, Washington, DC, Dec. 2016.

8. **K. Yang**, Y. Shi, and Z. Ding, "Low-rank matrix completion for mobile edge caching in Fog-RAN via Riemannian optimization," in *Proc. IEEE Global Commun. Conf. (Globecom)*, Washington, DC, Dec. 2016.

Technical Backgrounds

Mathematics

Matrix Analysis Stochastic Processes

Optimization

Convex Optimization Riemannian Optimization

Applied Mathematics and Engineering

Machine Learning Federated Learning Communication Theory Detection and Estimation

Computer Skills

Matlab, Python.