Feng Ye

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PRINCIPAL INTERESTS

My research interests span several areas in cyber-physical systems and distributed control systems, with a focus on distributed control and optimization, federated learning, smart grid, security and privacy preservation, attack detection, and their applications on microgrid and Internet of Vehicles.

APPOINTMENTS

Post-Doctoral Fellow Sept. 2024 - Present
University of Victoria, Victoria, BC, Canada

- Research in privacy preserving and security of federated learning, platooning control of Internet of Vehicles under direction of Prof. Lin Cai.

ACADEMIC BACKGROUND

Visiting Ph.D. Student, Electrical and Computer Engineering Oct. 2022 - Oct. 2023
University of Victoria, Victoria, BC, Canada

- Research in privacy preserving and security of federated learning under direction of Prof. Lin Cai.

Ph.D., Control Science and Engineering Sept. 2019 - Jun. 2024
Southeast University, Nanjing, Jiangsu, China

- Ph.D. research in privacy preserving and security of control systems under direction of Prof. Xianghui Cao and Prof. Mo-Yuen Chow.
- Dissertation title: Research on Privacy-Preserving Method for Distributed Economic Dispatch in Microgrids.

B.S., Electrical Engineering and Automation Sept. 2015 - Jun. 2019
Northeastern University, Shenyang, Liaoning, China

SPECIAL ACHIEVEMENTS

Selected Awards

- *People's Choice Award, Workshop on Future Ubiquitous Networks 2023-Spring*, IEEE Victoria Section Joint VTS/ComSoc Chapter, Canada, May 2023
- *Meritorious Winner Award, Mathematical Contest in Modeling*, the Consortium for Mathematics and Its Applications, USA, Apr. 2018
- *Honorable Mention Award, Mathematical Contest in Modeling*, the Consortium for Mathematics and Its Applications, USA, Apr. 2017
- *Outstanding Student Cadres Award*, Northeastern University, Sept. 2017

Scholarships

- *Ph.D. Candidate 83791 Qiuzhen Scholarship*, Southeast University, China, 2024
- *Ph.D. Candidate Scholarship*, Southeast University, China, 2020 - 2023
- *Postgraduate Student Scholarship*, Southeast University, China, 2019
- *National Encouragement Scholarship*, Ministry of Education, China, 2017
- *Undergraduate Student Scholarship*, Northeastern University, China, 2016 - 2019

Invited Lectures

- A Random-Weighted Privacy-Preserving Distributed Algorithm for Energy Management in Microgrid with Energy Storage Devices, IESES 2020
- Simulating and Evaluating Privacy Issues in Distributed Microgrids: A Cyber-Physical Co-Simulation Platform, IECON 2021
- A Random-Weight Privacy-Preserving Algorithm With Error Compensation for Microgrid Distributed Energy Management, Workshop on Future Ubiquitous Networks 2023-Spring

RESEARCH EXPERIENCE

Byzantine-robust federated learning *Jan. 2023 - present*

- Designed a Byzantine-robust federated learning algorithm to detect model poisoning attacks, which distinguishes malicious clients are based on probability distribution.

Secure control of distributed microgrids *Jan. 2021 - Dec. 2023*

- Designed a collusion attack against distributed energy management systems based on the microgrid network topology, which undermines the economic utility of microgrids.
- Designed a novel false data injection attack detection method for distributed energy management systems based on the microgrid network topology, which can detect malicious devices in microgrids while preserve the data privacy of each device.

Privacy-preserving distributed coordinate control *Jan. 2020 - Jun. 2024*

- Designed a novel privacy-preserving economic dispatch algorithm for distributed energy management system in microgrids, preserving privacy of the power information of devices.
- Drawed the upper bound of privacy-preserving performance of algorithms, and designed a multiplying-noise-based general privacy-preserving average consensus framework.

TEACHING EXPERIENCE

- *Guest Lecturer*, University of Victoria 2024 - Present
  ECE463/ECE514: Design and Analysis of Computer Networks
- *Guest Lecturer*, Southeast University 2021
  EE124: Large-Scale Grid Technology
- *Guest Lecturer*, Southeast University 2020
  SOA8122: System Identification and Modeling
- *Assistant and Lab Instructor*, Southeast University 2020 - 2023
  SOA1180: Introduction to Communication Networks

PUBLICATIONS

Journal Articles

1. **F. Ye**, X. Cao, M.-Y. Chow, and L. Cai, Privacy-Preserving Average Consensus: Fundamental Analysis and a Generic Framework Design, *IEEE Transactions on Information Theory*, vol. 70, no. 4, pp. 2870-2885, 2024.
2. **F. Ye**, X. Cao, Z. Cheng, and M.-Y. Chow, CASL: A Novel Collusion Attack against Distributed Energy Management Systems, *IEEE Transactions on Smart Grid*, vol. 14, no. 6, pp. 4717-4728, 2023.
3. **F. Ye**, Z. Cheng, X. Cao, and M.-Y. Chow, A Random-Weight Privacy-Preserving Algorithm With Error Compensation for Microgrid Distributed Energy Management, *IEEE Transactions on Information Forensics and Security*, vol. 16, pp. 4352-4362, 2021.

4. **F. Ye**, X. Cao, L. Cai, and M.-Y. Chow, False Noise Attack Detection for Differentially-Private Distributed Control of Microgrids, Submitted to *Automatica* as a Regular Paper, under the 2nd round of peer review.
5. **F. Ye**, L. Cai, and X. Cao, Normal is Normal: A Novel Byzantine-Robust Federated Learning Algorithm against Model Poisoning Attacks via Probability Distribution of Gradients, *under review.*
6. Z. Cheng, **F. Ye**, X. Cao, and M.-Y. Chow, A Homomorphic Encryption-Based Private Collaborative Distributed Energy Management System, *IEEE Transactions on Smart Grid*, vol. 12, no. 6, pp. 5233-5243, 2021.

Conference Proceedings

1. **F. Ye**, Z. Cheng, X. Cao, and M.-Y. Chow, A Random-Weighted Privacy-Preserving Distributed Algorithm for Energy Management in Microgrid with Energy Storage Devices, *2020 2nd IEEE International Conference on Industrial Electronics for Sustainable Energy Systems (IESES)*, Cagliari, Italy, 2020, pp. 249-254.
2. N. Hang, **F. Ye**, Z. Cheng, X. Cao, and M.-Y. Chow, Simulating and Evaluating Privacy Issues in Distributed Microgrids: A Cyber-Physical Co-Simulation Platform, *47th Annual Conference of the IEEE Industrial Electronics Society(IECON)*, Toronto, ON, Canada, 2021.

PROFESSIONAL SERVICE

Professional Activities

- Member, IEEE, 2024 - present
- Graduate Student Member, IEEE, 2020 - 2023

Peer Reviewer

- *Automatica*, 2022 - present
- *IEEE Transactions on Automatic Control*, 2022 - present
- *IEEE Transactions on Information Forensics and Security*, 2023 - present
- *IEEE Transactions on Industrial Electronics*, 2023 - present
- *IEEE Transactions on Industrial Informatics*, 2020 - present
- *IEEE Transactions on Control of Network Systems*, 2020 - present
- *IEEE Internet of Things Journal*, 2023 - present
- *IEEE Network Magazine*, 2023 - present
- *IEEE/CAA Journal of Automatica Sinica*, 2022 - present