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Currently working toward Ph.D., Student Member, IEEE

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Biography

Ruoyang Chen received the M.S. degree at the [College of Computer Science and Technology, Nanjing University of Aeronautics and Astronautics \(NUAA\)](#), Jiangsu, China, in 2024. He is currently working toward the Ph.D. degree at the College of Computer Science and Technology, NUAA, under the supervision of [Prof. Changyan Yi](#).

His main research interests include digital twin construction, federated/distributed system, game-theoretical AI agent design, DRL-based online optimization and physical/virtual layer security.

Experience

- Ph.D. Student: Spring 2024 to Present,
College of Computer Science and Technology, Nanjing University of Aeronautics and Astronautics (NUAA), China.
- M.S. Degree: Fall 2021 to Spring 2024,
College of Computer Science and Technology, Nanjing University of Aeronautics and Astronautics (NUAA), China.
- Overseas Studies for Undergraduates: Summer 2019,
Anderson School of Management, University of California Los Angeles (UCLA), USA.
- B.S. Degree: Fall 2017 to Summer 2021,
School of Computer Science, Nanjing University of Information Science & Technology (NUIST), China.
- High School Degree: Fall 2014 to Summer 2017,
[Nanjing Jinling High School](#), China.

Selected Honors

- Yinhang Program of NUAA, 2025-2027. NUAA
- Postgraduate Research & Practice Innovation Program of Jiangsu Province, 2025-2026. Jiangsu Provincial Department of Education
- Suzhou Industrial Park Scholarship, 2024. Suzhou Industrial Park
- Postgraduate Research & Practice Innovation Program of NUAA, 2023-2024. NUAA
- Excellent Paper Award by the 11th International Academic Conference for Graduates, 2023. NUAA
- NUAA Graduate Study Scholarship, 2021-2024. NUAA
- Scholarship Program of Overseas Studies for Undergraduates, 2019. Jiangsu Provincial Department of Education

Selected Publications

• Book/Book Chapter

[B1] Changyan Yi, **Ruoyang Chen**, Jiayuan Chen, Xiaolong Li and Jun Cai, "Self-Evolving Digital Twin over Wireless Networks: Dynamic Twin Construction and Service Interaction", *Wireless Networks Series*, Springer press, 2025. (ISBN: 978-3-032-08120-9)

• Journal/Magazine (* denotes the corresponding author)

[J9] **Ruoyang Chen**, Changyan Yi*, Haifeng Zhu, Wen Wu, Jiawen Kang and Dusit Niyato, "Dynamic Digital Twin Update by Adaptive Model Splitting and Reliable Crowdsourcing under Uncertain Data Distortions", *IEEE Transactions on Mobile Computing*, accepted. (SCI-Q1 TOP, CCF-A)

[J8] Cong Tang, Youwen Zhu*, **Ruoyang Chen**, Changyan Yi and Jian Wang, "GBC-UG: An Advanced Location Data Distribution Estimation Mechanism under Geo-Indistinguishability", *IEEE Transactions on Mobile Computing*, Accepted. (SCI-Q1 TOP, CCF-C)

[J7] Xiaolong Li, Jianhao Wei, Haidong Wang, Li Dong, **Ruoyang Chen**, Changyan Yi, Jun Cai, Dusit Niyato and Xuemin (Sherman) Shen, "Towards Intelligent Transportation with Pedestrians and Vehicles In-the-Loop: A Surveillance Video-Assisted Federated Digital Twin Framework", *IEEE Network Magazine*, Early Access. (SCI-Q3)

[J6] **Ruoyang Chen**, Changyan Yi*, Fuhui Zhou, Jiawen Kang, Yuan Wu and Dusit Niyato, "Federated Digital Twin Construction via Distributed Sensing: A Game-Theoretic Online Optimization with Overlapping Coalitions", *IEEE Transactions on Mobile Computing*, vol. 24, no. 11, pp. 12221-12238. (SCI-Q1 TOP, CCF-A)

[J5] Zenghui Qian, **Ruoyang Chen**, Changyan Yi*, Xiangping Zhai and Bing Chen, "Collision Avoidance Control for Autonomous Driving with Multiple Dynamic Obstacles in IoV: A Prediction-Enhanced APF-Based Approach", *IEEE Internet of Things Journal*, vol. 12, no. 13, pp. 24968-24984, Jul. 2025. (SCI-Q1 TOP, CCF-C)

[J4] Haipeng Zhou, **Ruoyang Chen**, Changyan Yi*, Jianjun Zhang, Jiawen Kang, Jun Cai and Mohsen Guizani, "A Repeated Coalition Formation Game for Physical Layer Security Aware Wireless Communications with Third-Party Intelligent Reflecting Surfaces", *IEEE Transactions on Wireless Communications*, vol. 24, no. 9, pp. 7612-7626, Sept. 2025. (SCI-Q1 TOP, CCF-B)

[J3] Denghui Liu, **Ruoyang Chen**, Changyan Yi*, Tong Zhang, Xiaolong Li, Juan Li, Ran Wang and Kun Zhu, "A Hierarchical Game for Physical Layer Security Aware Cooperative Communications with Dynamic Interchangeable Relaying and Jamming", *IEEE Transactions on Vehicular Technology*, vol. 74, no. 1, pp. 968-983, Jan. 2025. (SCI-Q2 TOP)

[J2] **Ruoyang Chen**, Changyan Yi*, Kun Zhu, Bing Chen, Jun Cai and Mohsen Guizani, "A Three-Party Hierarchical Game for Physical Layer Security Aware Wireless Communications with Dynamic Trilateral Coalitions", *IEEE Transactions on Wireless Communications*, vol. 23, no. 5, pp. 4815-4829, May 2024. (SCI-Q1 TOP, CCF-B)

[J1] Shanfei Shang, Changyan Yi*, Tong Zhang, **Ruoyang Chen** and Jun Cai, "Latency-Energy Aware Dynamic Application Placement for Edge Computing: A Vacation Queue Based Optimization Approach", *IEEE Transactions on Network Science and Engineering*, vol. 11, no. 2, pp. 2249-2263, Mar.-Apr. 2024. (SCI-Q2)

• Conference

[C12] **Ruoyang Chen**, Yujie Zhang, Ruizhi Wang and Changyan Yi, "DTAS: Adaptive Model Splitting for Dynamic Digital Twin Update with Edge Cloud Collaboration," *IEEE International Conference on Computer Communications (INFOCOM)*, Tokyo, Japan, May 18-21, 2026. (CCF-A)

[C11] You Shi, Yuye Yang, **Ruoyang Chen** and Chen Dai, "Quality-Aware Online Optimization for Reliability Guaranteed Microservice Deployment for Edge Computing Enabled Industrial IoT," *International Conference on Wireless Communications and Signal Processing (WCSP)*, Chongqing, China, Oct. 23-25, 2025. (EI)

[C10] You Shi, Yuye Yang, **Ruoyang Chen**, Chen Dai and Jiantao Shi, "Reliability-Aware Online Learning for Layer-Sharing-Based Digital Twin Deployment in Multi-Edge Systems," *IEEE Vehicular Technology Conference Workshops (VTC WKSHPs)*, Chengdu, China, Oct. 19-22, 2025. (EI)

[C9] Xinyu Yu, Yuye Yang, **Ruoyang Chen** and Changyan Yi, "Online Optimization of Edge Vehicle Digital Twin Migration with Adaptive Mobility Prediction," *IEEE Vehicular Technology Conference (VTC)*, Chengdu, China, Oct. 19-22, 2025. (EI)

[C8] Tianqing Man, Haifeng Zhu, **Ruoyang Chen** and Changyan Yi, "Hierarchical DRL-Based Multi-Motor Control with Torque Synchronization in Industrial IoT," *International Conference on Wireless Artificial Intelligent Computing Systems and Applications (WASA)*, Tokyo, Japan, Jun. 24-26, 2025. (CCF-C)

[C7] Junjie Wu, **Ruoyang Chen** and Changyan Yi, "A DRL-Based Deviation-Aware Federated Digital Twin Construction over Wireless Edge Network," *International Conference on Wireless Artificial Intelligent Computing Systems and Applications (WASA)*, Tokyo, Japan, Jun. 24-26, 2025. (CCF-C)

[C6] **Ruoyang Chen** and Changyan Yi, "A Game-Theoretic Online Optimization for Federated Digital Twin Construction via Wireless Sensing," *IEEE International Conference on Communications (ICC)*, Montreal, Canada, Jun. 8-12, 2025. (CCF-C)

[C5] Yuye Yang, You Shi, **Ruoyang Chen**, Changyan Yi and Jiawen Kang, "Online Optimization of Edge Empowered Human Digital Twin Deployment and Task Offloading," *IEEE/CIC International Conference on Communications in China (ICCC)*, Hangzhou, China, Aug. 7-9, 2024. (EI)

[C4] Denghui Liu, **Ruoyang Chen**, Tong Zhang and Changyan Yi, "A DRL-Based Hierarchical Game for Physical Layer Security Aware Cooperative Communications," *IEEE/CIC International Conference on Communications in China (ICCC)*, Hangzhou, China, Aug. 7-9, 2024. (EI)

[C3] Haipeng Zhou, **Ruoyang Chen**, Changyan Yi, Juan Li and Jun Cai, "A Three-Party Repeated Coalition Formation Game for PLS in Wireless Communications with IRSs," *IEEE Wireless Communications and Networking Conference (WCNC)*, Dubai, UAE, Apr. 21-24, 2024. (CCF-C)

[C2] Wenjie Zhu, **Ruoyang Chen**, Changyan Yi and Jun Cai, "Edge-Assisted Video Transmission with Adaptive Key Frame Selection: A Hierarchical DRL Approach," *Biennial Symposium on Communications (BSC)*, Montreal, Canada, Jul. 4-Jul. 7, 2023. (EI)

[C1] **Ruoyang Chen**, Changyan Yi, Kun Zhu, Bing Chen and Jun Cai, "A DRL-Based Hierarchical Game for Physical Layer Security with Dynamic Trilateral Coalitions," *IEEE International Conference on Communications (ICC)*, Rome, Italy, May 28-Jun. 1, 2023. (CCF-C)

Professional Activities

• Reviewer

- IEEE Transactions on Mobile Computing
 - IEEE Transactions on Wireless Communications
 - IEEE Internet of Things Journal
 - CMC-Computers, Materials & Continua
 - Computer Animation and Virtual Worlds
 - The Journal of Supercomputing
 - Sustainable Energy, Grids and Networks
 - Advances in Differential Equations and Control Processes
 - IEEE ICC, IEEE WCNC, IEEE VTC, IEEE GLOBECOM, WASA, etc.
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