

# YIXUAN LI

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## Education

### Southeast University

*Master of Computer Science, GPA: 86.38*

Advisor: Prof. Wanyuan Wang

Sep. 2022 – Jun. 2025

*Nanjing, China*

### Nanjing University of Posts and Telecommunications

*Bachelor of Computer Science, GPA: 86.36*

Advisor: Dr. Kang Xu

Sep. 2018 – Jun. 2022

*Nanjing, China*

## Research Interests

Artificial Intelligence; Reinforcement Learning; Operation Research; Multi-Agent Systems

*My research outputs now include 5 publications accepted, 2 pending submissions, and one granted patent.*

## Publications

- Factor Graph Neural Network Meets Max-Sum: A Real-Time Route Planning Algorithm for Massive-Scale Trips**, Proceedings of the 23rd International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS'24)  
*Yixuan Li, Wanyuan Wang\*, Weiye Xu, Yanchen Deng, Weiwei Wu.*
  - Designed a novel modeling approach: the Path-Query Factor Graph for global route planning problems;
  - Proposed a hybrid pruning technique to accelerate Max-Sum algorithm in different traffic conditions;
  - Developed an end-to-end, real-time response framework based on the factor graph neural networks.
- Decentralized Subgoal Tree Search for Multi-agent Planning without Priors or Communication**, Proceedings of the 19th International Conference on Mobility, Sensing and Networking (MSN'23)  
*Qian Che, Yixuan Li, Ziyao Peng, Wanyuan Wang\*, Yichuan Jiang.*
  - Improved distributed tree search algorithm by upstream planning to automatically extract sub-goals;
  - Introduced an expectation alignment technique to extend algorithm to non-communication scenarios.
- A Multi-agent Based Method for Large-Scale Route Planning Using Distributed Constraint Optimization**, The 6th IEEE International Conference on Unmanned Systems (ICUS'23)  
*Yixuan Li, Qian Che, Fengchen Wang, Yifeng Zhou, Chuanyou Li, Wanyuan Wang\*.*
  - Modeled the large-scale path planning problems as Distributed Constraint Optimization Problems.
- Explicit Coordination Based Multi-Agent Reinforcement Learning for Intelligent Traffic Signal Control**, The 18th CCF Conference on Computer Supported Cooperative Work and Social Computing  
*Yixuan Li, Qian Che, Yifeng Zhou, Wanyuan Wang\*, Yichuan Jiang.*
  - Enhanced inter-agent information sharing by predicting traffic flow and neighboring traffic light phases.
- A Method for Security Traffic Patrolling Based on Structural Coordinated Proximal Policy Optimization**, The 18th CCF Conference on Computer Supported Cooperative Work and Social Computing  
*Yixuan Li, Qian Che, Fengchen Wang, Huiying Zhang, Wanyuan Wang\*, Yichuan Jiang.*
  - Designed an efficient Shapley value decomposition method for reward function by local relationship.
- A Method for Fault Root Cause Localization Based on Network Topology and Real-Time Alarms**, China Invention Patent No. CN112181758B, Granted on 2023.  
*Kang Xu, Yixuan Li, Haiqi Liu, Xiaowei Zhang, Ning Ye, Ruchuan Wang.*
  - Devised a framework for root cause identification based on alarm nodes and their hierarchical topology.

## Works in Progress

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- Multiagent Reinforcement Learning-Based Flow Splitting for Network Packet Routing.**  
Under review, Submitted to JCR Q1 Journal  
*Qian Che<sup>†</sup>, Yixuan Li<sup>†</sup>, Yijing Wang\*, Haoran Chen, Wanyuan Wang, Weiwei Wu\*.*
  - Developed a novel multiagent modeling approach by representing traffic demand as agents.
  - Designed an attention-based pointer network to enhance feature extraction.
- Fast and Interpretable Mixed Integer Program Solving by Learning Parsimonious Strategy.**  
To be submitted to the top conference.  
*Yixuan Li, Wanyuan Wang\**
  - Designed an interpretable model parsimonious strategy and a strategy pruning method for MIP.
  - Designed an efficient solving method through preference-based reinforcement learning.

## Research Projects

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**Accelerating Large-Scale Supply Chain Problem Solving** **Jan. 2023 – Jul. 2023**  
*Huawei Technologies Co., Ltd.* *Shenzhen, China*

- Developed a solver acceleration method based on problem reduction for large-scale (integer) linear programming, predicted integers and identified active constraints to reduce the number of redundant constraints for a rapid solution.
- Reduced solution time to milliseconds on Huawei's real-world supply chain scheduling scenarios while ensuring 99% fidelity.
- With the warm start technology, achieved over ten times speed improvement on average compared to CPLEX under the same solution gap, won the Huawei Spark Award, advancing a collaborative project.

**Optimization of Data Center Cooling System** **Sep. 2022 – Dec. 2023**  
*China Mobile Communications Group Co., Ltd* *Wuxi, China*

- Trained a thermodynamic model of the cooling system using GNN and the relationship of the units.
- Designed a DRL-based control algorithm for cooling systems by DDPG with imitation learning.
- Test results showed a total power usage effectiveness (PUE) reduction of 35% compared to the original scheme, successfully deployed at the China Mobile Wuxi Data Center.

**Intelligent Anomaly Detection and Root Cause Localization** **Jun. 2020 – Jun. 2022**  
*State Key Laboratory of Smart Grid Protection and Control, NARI Group* *Nanjing, China*

- Designed a suite of anomaly detection algorithms based on statistical modeling, machine learning, and deep learning for multivariate time series. Techniques applied include GNN, Transformer, GAN, etc.
- Contributed to two papers and one patent, with both papers accepted by SCI-JCR Q2 journals.

## Awards

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|---|---|
| • 2023 Nov, Southeast University, Scholarship                                     | Algorithm Competition, Global Top 3%  |
| • 2023 Jul, Huawei Spark Award, Value Prize                                       | • 2021 Nov, "Challenge Cup" Academic Science and Technology Competition, National First Prize |
| • 2023 Jan, China Graduate Mathematical Contest in Modeling, National Third Prize | • 2020 Dec, Nanjing University of Posts and Telecommunications, Scholarship                   |
| • 2022 Nov, Southeast University, Scholarship                                     | • 2020 Oct, "Yuezuan Cup" Software Design Competition, Third Prize                            |
| • 2022 Apr, Alibaba Cloud Panjiu Intelligent                                      |   |

## Technical Skills

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**Languages:** Python, C/C++, Java, Julia, SQL

**Frameworks:** Pytorch, Gym, PyDCOP, PyG, CVXPY, CPLEX, Gurobi, SCIP, MySQL, Git, Redis

More information can be found on my [personal website!](#)