

TAOAN HUANG

taoanhua@usc.edu \diamond taoanhuang.github.io

EDUCATION

University of Southern California

Ph.D. student in Computer Science

Los Angeles, CA, USA

Aug 2019 - Aug 2024 (expected)

- Overall GPA: 4/4
- Recipient of a USC Annenberg Graduate Fellowship

Tsinghua University

B.Eng. in Computer Science

Beijing, China

Sep 2015 - Jul 2019

- Overall GPA: 3.6/4, Institute for Interdisciplinary Information Sciences
- Selected to Yao Class (a special pilot computer science class, directed by Professor Andrew Yao)

EXPERIENCE

Meta AI Research, FAIR Labs

Menlo Park, CA, USA

Research scientist intern mentored by Benoit Steiner and Dr. Yuandong Tian

May 2022 - Dec 2022

- Developed CL-LNS, an ML-guided framework for solving Integer Linear Programs. Outperformed state-of-the-art methods on multiple combinatorial optimization problems.
- Used machine learning to learn surrogate objectives for non-linear combinatorial optimization problems. Outperformed Meta's existing methods in recommendation systems and inverse photonic design.

Amazon Robotics

Remote, USA

Research scientist intern mentored by Dr. Vikas Shivashankar

May 2021 - Aug 2021

- Developed ROSETTA, a local search algorithm for multi-goal multi-agent path planning in congested warehouse environments. It solves large-scale warehouse problems and is 28% more effective than the current system.

University of Southern California

Los Angeles, USA

Research assistant mentored by Prof. Sven Koenig and Prof. Bistra Dilkina

Aug 2019 - Present

- Developed a series of state-of-the-art ML-guided search algorithms for Multi-Agent Path Finding.
- Developed a software for building seismic resilience water pipe networks tested on multiple water zones in the City of Los Angeles.

Carnegie Mellon University

Pittsburgh, PA, USA

Research intern mentored by Prof. Fei Fang

Feb 2018 - Jul 2018

- Developed a novel dynamic programming-based algorithm to dispatch pre-scheduled and on-demand requests in ride-share systems.
- Developed a game-theoretic framework to compute patrol strategies against poachers with the presence of community members for wildlife conservation.

RESEARCH FOCUS

My research focus lies in artificial intelligence, with particular attention to: machine learning, combinatorial optimization, multi-agent system, computational game theory and computational sustainability.

SELECTED HONORS

- Best Student Paper Runner-Up, ICAPS, 2023
- Outstanding Paper Award, ICML SODS Workshop, 2023
- Annenberg Graduate Fellowship, University of Southern California, 2019-2023
- Xuetao Program Fellowship, Tsinghua University, 2015-2019.
- Freshman Scholarship, Tsinghua University, 2015.
- Gold Medal (top 50 contestants, Team China candidate for IOI 2015), National Olympiad in Informatics, 2014.
- Gold Medal (top 25 contestants), Asia-Pacific Informatics Olympiad, 2014.

PUBLICATIONS

1. Junyang Cai, **Taoan Huang**, Bistra Dilkina. **Learning Backdoors for Mixed Integer Programs with Contrastive Learning**. In submission to IJCAI-24.
2. **Taoan Huang**, Aaron Ferber, Arman Zharmagambetov, Yuandong Tian and Bistra Dilkina. **Contrastive Predict-and-Search for Mixed Integer Linear Programs**. In submission to ICML-24.

3. Aaron Ferber, Arman Zharmagambetov, **Taoan Huang**, Bistra Dilkina and Yuandong Tian. **GenCO: Generating Diverse Solutions to Nonlinear Combinatorial Optimization Problems**. In submission to ICML-24.
4. Thomy Phan, **Taoan Huang**, Bistra Dilkina and Sven Koenig. **Adaptive Anytime Multi-Agent Path Finding Using Bandit-Based Large Neighborhood Search**. In Proceedings of AAAI-24.
5. Arman Zharmagambetov, Brandon Amos, Aaron Ferber, **Taoan Huang**, Bistra Dilkina and Yuandong Tian. **Landscape Surrogate: Learning Decision Losses for Mathematical Optimization Under Partial Information**. In Proceedings of NeurIPS-23.
6. Sumedh Pendurkar, **Taoan Huang**, Brendan Juba, Jiapeng Zhang, Sven Koenig and Guni Sharon. **The (Un) Scalability of Informed Heuristic Function Estimation in NP-Hard Search Problems**. Transactions on Machine Learning Research.
7. Shuwei Wang, Vadim Bulitko, **Taoan Huang**, Sven Koenig and Roni Stern. **Synthesizing Priority Planning Formulae for Multi-Agent Pathfinding**. In Proceedings of AIIDE-23.
8. **Taoan Huang**, Aaron Ferber, Yuandong Tian, Bistra Dilkina, Benoit Steiner. **Searching Large Neighborhoods for Integer Linear Programs with Contrastive Learning**. In Proceedings of ICML-23.
9. Aaron Ferber, **Taoan Huang**, Daochen Zha, Martin Schubert, Benoit Steiner, Bistra Dilkina, Yuandong Tian. **SurCo: Learning Linear Surrogates For Combinatorial Nonlinear Optimization Problems**. In Proceedings of ICML-23. **Outstanding Paper Award at the ICML-23 SODS Workshop**.
10. **Taoan Huang**, Vikas Shivashankar, Michael Caldara, Joseph Durham, Jiaoyang Li, Bistra Dilkina, Sven Koenig. **Deadline-Aware Multi-Agent Tour Planning**. In Proceedings of ICAPS-23. **Best Student Paper Runner-Up**.
11. **Taoan Huang**, Aaron Ferber, Yuandong Tian, Bistra Dilkina, Benoit Steiner. **Local Branching Relaxation Heuristics for Integer Linear Programs**. In Proceedings of CPAIOR-23.
12. Shuyang Zhang, Jiaoyang Li, **Taoan Huang**, Sven Koenig, Bistra Dilkina. **Learning a Priority Ordering for Prioritized Planning in Multi-Agent Path Finding**. In Proceedings of the Symposium on Combinatorial Search 2022.
13. **Taoan Huang**, Jiaoyang Li, Bistra Dilkina, Sven Koenig. **Anytime Multi-Agent Path Finding via Machine Learning-Guided Large Neighborhood Search**. In Proceedings of AAAI-22.
14. **Taoan Huang**, Bistra Dilkina, Sven Koenig. **Learning to Select Nodes for Bounded-Suboptimal Conflict-Based Search for Multi-Agent Path Finding**. In Proceedings of AAMAS-21.
15. **Taoan Huang**, Bistra Dilkina, Sven Koenig. **Learning to Resolve Conflicts for Multi-Agent Path Finding with Conflict-Based Search**. In Proceedings of AAAI-21.
16. **Taoan Huang**, Bistra Dilkina. **Enhancing Seismic Resilience of Water Pipe Networks**. In Proceedings of COMPASS-20.
17. Weiran Shen, Weizhe Chen, **Taoan Huang**, Rohit Singh, Fei Fang. **When to Follow the Tip: Security Games with Strategic Informants**. In Proceedings of IJCAI-20.
18. **Taoan Huang**, Weiran Shen, David Zeng, Tianyu Gu, Rohit Singh, Fei Fang. **Green Security Game with Community Engagement**. In Proceedings of AAMAS-20.
19. **Taoan Huang**, Bohui Fang, Xiaohui Bei, Fei Fang. **Dynamic Trip-Vehicle Dispatch with Scheduled and On-Demand Requests**. In Proceedings of UAI-19.

ADDITIONAL INFORMATION

Services

- Reviewer for ICLR (2024), NeurIPS (2023), ICML (2023, 2024), AAAI (2021, 2022, 2023, 2024), IJCAI (2024), AIES (2022), SoCS (2021, 2022), EAAMO (2022), AIIDE (2023), CPAIOR (2023, 2024), JINT.

Teaching Experiences

- Olympiad in Informatics, Invited Lecturer (2012-2018): Invited to give lectures on algorithms and programming to high school students, which ranged from 50 to 80 attendees each year
- CSCI 360 (Spring 2022), CSCI 170 (Spring 2024) at USC

Programming Skills

- Languages: C++, Python, Pascal, Java, C
- Software: Gurobi, PyTorch, LaTeX, QGIS, SCIP.