Chengpeng Hu

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Education

Eindhoven University of Technology July 2024 – June 2028 (expected)
PhD student *Eindhoven, Netherlands*

Southern University of Science and Technology Sep. 2021 – June 2024
Master student of Computer Science (Degree in Electronics Science and Technology) *Shenzhen, China*

Southern University of Science and Technology Sep. 2017 – June 2021
B.E. in Computer Science and Technology *Shenzhen, China*

Research Projects

Game AI → Playing 2020 – 2024
Southern University of Science and Technology (Supervisors: Dr. Jialin Liu and Prof. Xin Yao)

- Explainable Procedural content generation via reinforcement learning
- 3D Scenario generation in Minecraft via large language model/Search-based methods
- Review on Game-based platforms for AI research → playing and content generation
- Reinforcement learning with dual-observation for general video game playing
- Rank first in the 2020 GVGAI Learning Competition.

Reinforcement Learning (RL) → Decision-making 2021 – 2024
Southern University of Science and Technology (Supervisors: Dr. Jialin Liu and Prof. Xin Yao)

- Constrained RL: Combine constrained evolutionary algorithm and reinforcement learning for robot controlling.
- Multi-Agent RL: Multi-robot task allocation via constrained multi-agent reinforcement learning.
- Evolutionary RL: Combine evolutionary computation and reinforcement learning. (co-supervised by Prof. Kay Chen Tan (PolyU))

Smart Logistics → Optimising, Planning and Scheduling 2020 – 2024
Southern University of Science and Technology (Supervisors: Dr. Jialin Liu and Prof. Xin Yao)

- Dynamic material handling problem formulation, simulator, problem dataset and constrained reinforcement learning based agent for scheduling.
- Constrained evolutionary reinforcement learning for dynamic material handling.
- Formulate and design heuristics to solve the split delivery vehicle routing problems with three-dimensional loading constraints.

Simultaneous Localization and Mapping with Millimeter-wave Radar 2020
Southern University of Science and Technology (Supervisor: Dr. Jin Zhang)

Services & Experiences

Session Chair on Reinforcement Learning I 2023
2023 International Joint Conference on Neural Networks

Publicity Co-chair 2023
2023 IEEE Conference on Games

Volunteer 2022
2022 IEEE Conference on Games

Teaching assistant 2021
2021 Computational Intelligence Summer School

Reviewer
CoG, ToG, TEVC, KBS and TAI

Robotics Intern in UBTECH 2020
Navigation and localization group, Shenzhen Research Institute, UBTECH

Dagstuhl Seminar 2024

Teaching

Teaching Assistant

Southern University of Science and Technology

- 2023 Reinforcement Learning, graduate course
- 2022-2023 Introduction to Computer Programming A, undergraduate course
- 2022-2023 Computer System Design and Applications A, undergraduate course
- 2021-2022 Advanced Artificial Intelligence, graduate course

Awards

Outstanding Graduate Student Dissertation (SUSTech) 2024
- *"Dynamic Material Handling via Constrained Reinforcement Learning"*

Outstanding Graduate Student (CSE in SUSTech) 2024

Outstanding Undergraduate Student Dissertation (CSE in SUSTech) 2021
- *"Layer-based Heuristics for Split Delivery Vehicle Routing Problems with Three-dimensional Loading Constraints"*

The 2020 GVGAI Learning Competition 1st Place Winning AI 2020

Asia Supercomputer Community Second Class Prize 2018

China Parallel Application Challenge on Domestic CPU Second Class Prize 2018

XiaoAi Skill (NLP) Development Competition Third Prize 2018

Scholarships & Grants

IEEE CIS Travel Grants 2024

SUSTech Graduate Student Travel Grants 2023

IEEE CIS Graduate Student Research Grants (only 6 awarded globally in 2023) 2023
- *"Distilling Evolutionary Reinforcement Learning via Cooperative Coevolution"*
- Supervised by Dr. Jialin Liu, Prof. Kay Chen Tan (PolyU) and Prof. Xin Yao

Sony AI Scholarship 2022

Publications

* equal contribution.

12. **Chengpeng Hu**, Ziming Wang, Jialin Liu, Chengqi Zhang and Xin Yao. "Robust dynamic material handling via adaptive constrained evolutionary reinforcement learning", *IEEE Transactions on Neural Network and Learning Systems*, 2024 (under review).
11. **Chengpeng Hu**, Jialin Liu, Xin Yao. "Evolutionary reinforcement learning via cooperative coevolution", under review.
10. **Chengpeng Hu***, Yunlong Zhao*, Jialin Liu. "Game generation via large language models", in *IEEE Conference on Games*, 2024, pp. 1-4.
9. Shiying Hu*, Zengrong Huang*, **Chengpeng Hu**, Jialin Liu. "3D building generation in Minecraft via large language models", in *IEEE Conference on Games*, 2024, pp. 1-4.
8. **Chengpeng Hu**, Yunlong Zhao, Ziqi Wang, Haocheng Du, Jialin Liu. "Games for Artificial Intelligence Research: A Review and Perspectives", *IEEE Transactions on Artificial Intelligence*, 2024 (accepted). [PDF] [Code]
7. Ziqi Wang, **Chengpeng Hu**, Jialin Liu, Xin Yao. "Negatively correlated ensemble reinforcement learning for online diverse game level generation", in *International Conference on Learning Representations*, 2024 (accepted).
6. Yunlong Zhao*, **Chengpeng Hu***, Jialin Liu. "Playing with Monte-carlo tree search", *IEEE Computational Intelligence Magazine*, vol. 19, no. 1, pp. 85-86, 2024.
5. Shuo Huang, **Chengpeng Hu**, Julian Togelius, Jialin Liu. "Generating redstone style cities in Minecraft", in *IEEE Conference on Games*, 2023, pp. 1-4. [PDF]

4. **Chengpeng Hu**, Ziming Wang, Jialin Liu, Junyi Wen, Bifei Mao, Xin Yao. "Constrained reinforcement learning for dynamic material handling", in *2023 International Joint Conference on Neural Networks*, 2023, pp. 1-9. [PDF] [Code]

3. **Chengpeng Hu**, Jiyuan Pei, Jialin Liu, Xin Yao. "Evolving constrained reinforcement learning policy", in *2023 International Joint Conference on Neural Networks*, 2023, pp. 1-8. [PDF] [Code]

2. **Chengpeng Hu**, Ziqi Wang, Tianye Shu, Hao Tong, Julian Togelius, Xin Yao, Jialin Liu. "Reinforcement learning with dual-observation for general video game playing". *IEEE Transactions on Games*, vol. 15, no. 2, pp. 202-216, 2023. [PDF] [Code]

1. Jiyuan Pei, **Chengpeng Hu**, Jialin Liu, Yi Mei and Xin Yao. "Bi-objective splitting delivery VRP with loading constraints and restricted access", in *IEEE Symposium Series on Computational Intelligence*, 2021, pp. 1-9. [PDF] [Code]