Jiyuan Pei (裴季源)

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EDUCATION

Master of Engineering, Electronic Science and Technology Sep. 2020 – July 2023
Southern University of Science and Technology Shenzhen, China
Dissertation: "Adaptive Operator Selection for Solving Vehicle Routing Problems"
Supervised by Dr. Jialin Liu and Prof. Xin Yao

Bachelor of Engineering, Computer Science and Technology Sep. 2016 – July 2020
Southern University of Science and Technology Shenzhen, China

JOB EXPERIENCE

Researching assistant in LOG Group July 2023 - Feb. 2024
Southern University of Science and Technology Shenzhen, China

Teaching assistant of lecture: Evolutionary Computation and Its Applications Sep. 2020 - Feb. 2021
Southern University of Science and Technology Shenzhen, China

RESEARCH INTERESTS

Adaptive Operator Selection, Vehicle Scheduling, Evolutionary Computation

PROJECTS

Vehicle scheduling in intelligent logistic Oct. 2020 – Present
Southern University of Science and Technology, supervised by Dr. Jialin Liu and Prof. Xin Yao Shenzhen, China

- Dynamic and adaptive search operator selection of meta-heuristic algorithms in vehicle routing problems.
- Formulation and optimisation of complex large-scale real-world vehicle routing problems.

Intelligent aero-engine calibration July 2020 – July 2022
Southern University of Science and Technology, supervised by Dr. Jialin Liu Shenzhen, China

- Develop heuristic single-objective evolutionary algorithm for aero-engine calibration.
- Design and implement the visualization and management web system for aero-engine calibration and task scheduling.

Multi-agent playing in multiplayer online battle arena (MOBA) games Nov. 2019 – June 2020
Intern in Lightspeed & Quantum Studios Group, Tencent Shenzhen, China

- Design heuristic of agents in various scenarios of MOBA games.
- Implement and test an RL algorithm for agent in MOBA game.

PUBLICATIONS

1. **J. Pei**, H. Tong, J. Liu, Y. Mei, and X. Yao. "Local Optima Correlation Assisted Adaptive Operator Selection," In Genetic and Evolutionary Computation Conference (GECCO), ACM, pp. 339-347, 2023. **(Oral presented)** [Paper]
   We propose a metric local optima correlation (LOC) to measure the relation between search operators in meta-heuristic algorithm. We design the framework of LOC-assisted AOS to improve performance of component AOS approaches.

2. **J. Pei**, Y. Mei , J. Liu, and X. Yao. ‘‘An Investigation of Adaptive Operator Selection in Solving Complex Vehicle Routing Problem," in Pacific Rim International Conference on Artificial Intelligence (PRICAI), Springer, pp. 562-573, 2022. **(Oral presented)** [Paper]
   In this paper, we proposed a novel analysis method to test if the problem is suitable for stateless adaptive search operator selection (AOS) approaches, the commonly used AOS category, and investigated the characteristics of the approaches in a complex real-world vehicle routing problem.

3. **J. Pei**, C. Hu, J. Liu, Y. Mei and X. Yao, ‘‘Bi-Objective Splitting Delivery VRP with Loading Constraints and Restricted Access,’’ IEEE Symposium Series on Computational Intelligence (SSCI). IEEE, pp. 01-09, 2021. **(Oral presented)** [Paper]

   We build the mathematical formulation for a complex vehicle routing problem, 3L-SDVRP, from real-world logistic scenarios. A meta-heuristic algorithm is proposed in this work for solving the problem efficiently.

4. J. Liu, Q. Zhang, **J. Pei**, H. Tong, X. Feng, and F. Wu, ‘‘fSDE: efficient evolutionary optimisation for many-objective aero-engine calibration,’’ Complex & Intelligent Systems, vol. 8, no. 4. Springer, pp. 2731–2747, 2021. **(IF 6.7, JCR Q1)**

   In this work a aero-engine calibration problem with hundreds of evaluation indicators is formulated as a many-objective optimisation problem and solved. Based on the problem characteristics, a many-objective evolutionary algorithm, a single objective evolutionary algorithm together with a specific transformer that transfer the problem into single objective is designed and test. I finished the work of the single objective algorithm.

VOLUNTEER ACTIVITIES

- Teaching assistant in the 2021 Computational Intelligence Summer School

  Hosted by SUSTech and the IEEE CIS Shenzhen Chapter. I had introduced Computational Intelligence techniques to high school students by demonstrating the game Snake played by a genetic algorithm and a reinforcement learning agent and taught the students to implement the agents.

- Technician in 2022 IEEE Conference on Games

  I worked as volunteer to assistant the online conference hosting, meeting organisation and recording.

SKILLS

Programming

- Python (deep learning with pytorch)
- Matlab
- C/C++
- Java (web server design based on Springboot)

Language

- IELTS 7.0