

Shanlin Jiang

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EDUCATION

Sichuan University, College of Computer Science

Chengdu, China

Master of Science, Major: Computer Science and Technology

2020.09 – Expected 2023.06

- Main research directions: Multi-objective Optimization Problems, Evolutionary Algorithms
- Key courses: Fundamentals of Modern Mathematics, Data Mining, Data Analysis and Practice, etc.
- Selected awards: The Third Prize of China National Academic Scholarship (2020, 2021, 2022)
- TOEFL:105, GRE: 152+169+3

Sichuan University, Business School

Chengdu, China

Bachelor of Management, Major: Electronic Business

2016.09 - 2020.06

- GPA:3.60 / 4.0 (Top 15%)
- Key courses: Operations Research, Applied Statistics, C++, Data Structure, Database Technology, etc.
- Selected awards: University Scholarship (2016, 2017, 2018)

RESEARCH INTERESTS

- **Algorithms:** Exact Methods, Heuristics & Meta-heuristics, Hybrid Approaches, Machine Learning
- **Model:** Mixed Integer Programming, Linear Programming
- **Applications:** Transportation and logistics, New Energy

ACADEMIC EXPERIENCE

1) A Multi-Scenario Optimization Evolutionary Algorithm Based on Transfer Framework

First Author, Supervised by Prof. Gary G. Yen and Prof. Zhenan He

2021.07 - 2022.10

S. Jiang, G. G. Yen, and Z. He, “A Multi-Scenario Optimization Evolutionary Algorithm Based on Transfer Framework,” in *IEEE Transactions on Evolutionary Computation*, early access, 2022, doi: 10.1109/TEVC.2022.3211643.

The uncertainty optimization problem is condensed into multiple discrete representative optimization scenarios, the multi-scenario optimization evolutionary algorithm based on knowledge transfer (MSOEA) is designed to tackle this problem.

- Innovated using distribution information of solutions in the selection mechanism to effectively search for solutions with compromised optimal performance among all scenarios.
- Designed an adaptive knowledge transfer strategy enabling positive knowledge transfer between different scenarios to accelerate the search process for selecting optimal solutions in each scenario.
- Compared with other state-of-the-art multi-scenario optimization algorithms, MSOEA can effectively improve the optimality of the final solution and reduce the complexity of the algorithm.

2) The Applications of Hybrid Approach Combining Exact Method and Evolutionary Algorithm in Combinatorial Optimization

Co-First Author, Work in Progress

2022.08 - Present

Hybrid algorithms based on exact methods and heuristic algorithms show outstanding performance in solving large scale combinatorial optimization problems, which combine the search ability from population-based approaches and the interpretability in exact methods, thus promotes the application of those algorithms in real world problems. In this survey:

- Reviewed existing research on hybrid algorithms combining exact methods and evolutionary algorithms.
- Summarized the characteristics of the existing algorithms, and directing the future research.

PROJECT EXPERIENCE

1) Research on Data-driven Robust Multi-objective Evolutionary Algorithm and Application

Research Assistant, Supervised by Prof. Zhenan He

2021.01 - Present

Funding: National Natural Science Foundation of China

- Analyzed the characteristics of the multi-objective optimization problem under uncertainty and summarized the key issues.

- Considering the problem with strong perturbations between each environment, which cannot be modeled as the robust optimization problem, different environments are summarized into different scenarios, and **the problem is condensed into a multi-scenario optimization problem**. To solve this problem, the multi-scenario optimization evolutionary algorithm (MSOEA) is designed.

2) Optimization Decision-making System of Smart Factory for Electronic and Electrical Industry

Research Assistant, Supervised by Prof. Zhenan He, Cooperated with Sichuan Changhong Electric Co., Ltd. 2020.09 - 2021.08

Funding: **Provincial and Municipal Projects**

- Collected and organized problems existed in the complex manufacturing process of the electronic and electrical appliances industry, and **refining the key problem as the robust high-dimensional multi-objective optimization problem**.
- Studied related research on robust optimization evolutionary algorithms and writing report.

TEACHING EXPERIENCE

1) Course: Matrix Analysis

Teaching Assistant, Teacher: Prof. Zhenan He

2021 Fall

- Taught practice sessions.
- Corrected homework and examinations.

2) Course: Evolutionary Computation and Multi-objective Optimization

Teaching Assistant, Teacher: Prof. Gary G. Yen (Regent professor, Oklahoma State University) 2021 Spring, 2022 Spring

- Communicated with Prof. Gary G. Yen and the administration at Sichuan University to organize the course.
- Responsible for homework correcting and answering students' questions.
- Helped in translating difficult key points in the course.

COMPETITION EXPERIENCE

COMAP's The Interdisciplinary Contest in Modeling (ICM)

Team Leader, **Meritorious Winner (Top 7.09%)**

2019.01

Modeling and analysis of tourist escape and rescue personnel approach schemes in the Louvre fire scene. Mainly responsible:

- Collected data to estimate the passenger flow in different exhibition halls and at different times of the Louvre venues.
- **Responsible for the algorithm design:**
 1. Considering the best escape path for people on multiple layers, the entire building is abstracted into a node-link model, and problem is condensed as the Minimum Cost Maximum Flow problem.
 2. The problem of finding the best rescue path is condensed as the shortest path problem, and the Dijkstra algorithm is used.
- Responsible for the program implementation and the writing of English reports.

ADDITIONAL INFO

1) Skills

- Proficient in Python and Excel, and familiar with MATLAB, C++, and LATEX.
- Skilled with common methods in operation research, e.g., Simplex, Column Generation, Branch and Bound.

2) Personal Traits

- **Strong adaptability and learning ability.** As a student who switched major from business to computer science, can quickly learn computer programming and operations research related knowledge, and carry out practice and paper writing.
- **Good communication and coordination skills.** Participated in the Drucker Management Association of Sichuan University and served as the department minister, responsible for personnel training and hosting the National E-commerce Innovation/Creativity/Entrepreneurship Competition Sichuan University Competition.
- **Optimistic and positive.** a team player, able to work under pressure, with a high level of execution, and able to withstand high intensity work.