Qingquan Zhang

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Education

Southern University of Science and Technology (SUSTech) **August, 2019 - June, 2022**

- Post graduate, Computer Science and Technology, Department of Computer Science and Engineering
- Research Interest: Multi-objective Optimisation, Machine Learning
- GPA: 3.69/4
- State Rank: **3/38**

Xidian University **September, 2015 - June, 2019**

- Bachelor, Intelligence Science and Technology, School of Artificial Intelligence
- GPA: 3.8/4
- State Rank: **5/154**

Projects

Fairness in Machine Learning

- Review and master knowledge about fairness in machine learning, including its definitions, metrics, algorithms that mitigate discrimination.
- Proposed a novel multi-objective evolutionary (ensemble) learning framework for mitigating unfairness in machine learning models considering simultaneously multiple (un)fairness measures.

Many-objective Optimisation

- Review and master knowledge about many-objective optimisation, including the state-of-the-art algorithms, its applications in real world.
- Proposed a fast many-objective evolutionary optimisation algorithm to search for parameters with an acceptable performance accuracy and improve the calibration efficiency in a real-world aero-engine calibration problem.
- Proposed a robust, parameterless, and efficient MaOEA based on an improved version of shift-based density estimation (SDE).

Vehicle Routing in Combinatorial Optimisation

- Proposed a novel method to measure and improve the diversity of solutions in decision variable space, which significantly improves efficiency of the decomposition-based memetic algorithm (D-MAENS).

Publications

1. **Zhang, Q.**, Liu, J., Zhang, Z., Wen, J., Mao, B., & Yao, X. (2022, September) "Mitigating Unfairness via Evolutionary Multi-objective Ensemble Learning," in IEEE Transactions on Evolutionary Computation, doi: 10.1109/TEVC.2022.3209544.
2. **Zhang, Q.**, Liu, J., Zhang, Z., Wen, J., Mao, B., & Yao, X. (2021, September). Fairer Machine Learning Through Multi-objective Evolutionary Learning. In International Conference on Artificial Neural Networks (pp. 111-123). Springer, Cham.
3. Tong, H., Pei, J., **Zhang, Q**., Liu, J., Feng, X., & Wu, F. (2021, October). Learning Boosts Optimisation: Fast Surrogate-Assisted Real Engine Calibration. In 2021 IEEE Symposium Series on Computational Intelligence. IEEE.
4. Liu, J.,**Zhang, Q.**, Pei, J., Tong, H., Feng, X., & Wu, F. (2021, May). fSDE: Efficient Evolutionary Optimisation for Many-objective Aero-engine Calibration. Complex & Intelligent Systems, 1-17. **(Student first)**
5. **Zhang, Q**., Wu, F., Tao, Y., Pei, J., Liu, J., & Yao, X. (2020, December). D-MAENS2: A Self-adaptive D-MAENS Algorithm with Better Decision Diversity. In 2020 IEEE Symposium Series on Computational Intelligence (pp. 2754-2761). IEEE.
6. Li, C., Pei, J., **Zhang, Q**., Liu, J., & Yao, X. (2020, December). An Extendable Platform for Routing Problem: Optimisation, Evaluation and Solution Visualisation. In 2020 IEEE Symposium Series on Computational Intelligence (pp. 2391-2398). IEEE.
7. Tong, H., **Zhang, Q**., Hu, C., Feng, X., Wu, F., & Liu J. (2022, May). Simpler Is Sometimes Better: Dynamic Aero-Engine Calibration. International Conference on Swarm Intelligence

Patent

National Invention Patent

1. An optimisation method, installation, computation equipment, and storage media in engine calibration problems (202110384258.6 substantive examination, publicity)
2. A many-objective optimisation method in solving engine calibration optimisation problems based on shift-based density estimation (202110689579.7 substantive examination, non-publicity)
3. A many-objective optimisation method improving fairness of machine learning models (202110655819.1 substantive examination, non-publicity)
4. A model training method in mitigating discrimination based on multi-objective evolutionary learning (202110653352.7 substantive examination, publicity)

Software Copyright

1. An optimisation method in engine calibration problem SDE-MOEA

Academic Communication

1. Participated and put an oral presentation in 2020 IEEE Symposium Series on Computational Intelligence
2. Participated and put an oral presentation in 2021 International Conference on Artificial Neural Networks