Zidong Wang

15991894024 zidowang@cityu.edu.hk github.com/wzd2502
City University of Hong Kong PhD in Engineering July, 1997
Hong Kong

I completed my undergraduate studies at the Honors College of Northwestern Polytechnical University (NWPU). I was then admitted directly to the Ph.D. program at NWPU's School of Electronics and Information, where I conducted research under the supervision of Prof. Xiaoguang Gao. My research focused on machine learning, causal discovery algorithms, and their applications in modeling complex uncertain systems. After obtaining my Ph.D., I joined the Department of Computer Science at City University of Hong Kong for further research. Under the supervision of Prof. Qingfu Zhang (Chair Professor, IEEE Fellow, Chang Jiang Scholar), I focus on multi-objective optimization algorithms and automatic algorithm design using large language models.

Education

Jun. 2025 Jun. 2024	College of Computing, **City University of Hong Kong** Research Assistant (Supervisor: Prof. Qingfu Zhang) in Department of Computer Science
Apr. 2024 Sep. 2018	School of Electronics and Information, **NWPU** Ph.D. in Engineering (Supervisor: Prof. Xiaoguang Gao) in Control Science and Engineering
Jun. 2018 Sep. 2014	Honors College / School of Electronics and Information, **NWPU** B.Eng. in Systems Engineering

Research Projects

- **Model-based Evolutionary Parametric Optimization**
  Sponsored by: General Research Fund supported by University Grants Committee of HK (GRF 9043695, Jan.2025-)
  We develop novel and efficient model-based evolutionary algorithms for parametric optimization. By leveraging the information obtained from solving problem instances with different problem parameter values, we propose to build a math model, such as GP or NN model, for approximating the whole solution set for a given parametric optimization problem conditioned on the problem parameter value.
- **Exactness and Component Sharing in Expensive Evolutionary Multiobjective Optimization**
  Sponsored by: General Research Fund supported by University Grants Committee of HK (GRF 9043546, Jan.2024-)
  We develop and study Bayesian optimization algorithms for finding a finite number of optimal solutions to exactly fit the decision maker's preferences, a linear function for modeling all the optimal solutions close to a given preference, and a general model for all the optimal solutions to an expensive multiobjective optimization problem. All these algorithms treat component sharing as their constraints.
- **Bayesian Network Learning with Small Datasets and Its Applications**
  Sponsored by: National Natural Science Foundation of China (Grant No. 61573285, Sep.2018-Jan.2020)
  To address the low accuracy of Bayesian Network (BN) learning under small datasets, we developed methodologies to mathematically formalize heterogeneous expert knowledge—varying in type, reliability, form, and source—into structural and parametric constraints. We integrated these into BN structure learning and parameter learning, and validated the approach in complex uncertain system modeling.
- **Indicator System and Quantitative Characterization Methodology**
  Sponsored by: Major Fundamental Research Project for Equipment (Dec.2022-Jan.2024)
  To fulfill requirements for constructing a specific indicator system, we designed a quantitative characterization model. This included performing sensitivity analysis of complex indicator networks, evaluating node contribution metrics, implementing hierarchical indicator network-based decomposition, and establishing a scenario-agnostic indicator framework.

Publications & Patents

- **Wang, Z. D.**, Gao, X. G.*, Yang, Y., Tan, X. Y., & Chen, D. Q. (2021). Learning Bayesian networks based on order graph with ancestral constraints. *Knowledge-Based Systems*, 211, 106515. (CAS Q1, WOS: 000600314300016)
- **Wang, Z. D.**, Gao, X. G.*, Tan, X. Y., & Liu, X. H. (2021). Learning Bayesian networks using A* search with ancestral constraints. *Neurocomputing*, 451, 107-124. (CAS Q2, WOS: 000662813300010)
- **Wang, Z. D.**, Gao, X. G.*, Tan, X. Y., & Liu, X. H. (2021). Determining the direction of the local search in topological ordering space for Bayesian network structure learning. *Knowledge-Based Systems*, 234, 107566. (CAS Q1, WOS: 000712466600013)
- **Wang, Z. D.**, Gao, X. G.*, & Liu X. H. (2024). Target threat assessment using ensemble BN networks based on Stacking strategy. *Systems Engineering and Electronics*, 46(02), 586-598. (EI, Selected for Excellence Action Plan for China STM Journals)
- Wang, H., **Wang, Z. D.***, Zhong, R. G., Liu, X. H., & Gao, X. G. (2024). The improved ordering-based search method incorporating with ensemble learning. *Cognitive Computation*, 16(3), 852-876. (CAS Q3)
- **Wang, Z. D.**, Gao, X. G.*, Liu, X. H., Ru, X. X., & Zhang, Q. F. (2024). Incorporating structural constraints into continuous optimization for causal discovery. *Neurocomputing*, 127902. (CAS Q2, WOS: 001247072600001)
- **Wang, Z. D.**, He, C. C., Gao, X. G., Yan, X. C., & Zhang, Q. F.* (2025). LLM-supervised causal threat assessment model. *Journal of Command and Control*, 11(2), 191-201.
- **Wang, Z. D.**, Liu, F., Feng, Q., Zhang, Q. F.*, & Gao, X. G. (2025). LLM-enhanced Score Function Evolution for Causal Structure Learning. *Proceedings of IJCAI 2025.* (CCF A).
- **Wang, Z. D.**, Gao, X. G., & Zhang, Q. F.* (2025). Uncertain Priors for Graphical Causal Models: a Multi-objective Optimization Perspective. *IEEE Transactions on Knowledge and Data Engineering.* (CAS Q1, CCF A).
- **Additional publications where I am not first/corresponding author available on my** Google Scholar profile.
- Gao, X. G., Zhong, R. G., Wang, Q. L., Tan, X. Y., & **Wang, Z. D.** (2025). *A method for analyzing enemy/own target recognition effectiveness based on expert experience and Bayesian networks*. China Invention Patent: CN114722899B (Granted: May 27, 2025).

Honors & Awards

2025	Award for CICC (Chinese Institute of Command and Control) Doctoral Dissertation Incentive Program Academic publication "Constrained Bayesian Network Learning and Applications" (Gao X.G., Wang Z.D., He C.C.) applied for National Defense Science and Technology Book Publication Fund
2024	Guest Editor Special Issue "Bayesian Networks and Causal Discovery", *Entropy* (IF: 2.0)
2023	Third Prize, System Innovation Competition, Mission Planning Application Maker Contest Awarding Units: Joint Staff Department of the Central Military Commission & Central Military Commission Science and Technology Commission (Student Rank: 1)
2022	NWPU Second Class Scholarship NWPU Outstanding Graduate Student AVIC Second Class Special Scholarship
2021	National Scholarship for Doctoral Candidates Excellent Presenter, Chinese Aeronautics Society Graduate Forum Excellent Presenter, Uncertainty Artificial Intelligence Committee Academic Salon
2018	NWPU Honors College Scholarship