Zhichao Chen/ Ziciu Can (Wade-Giles)

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https://ziciucanjustus.github.io/

Experience

Doctor of Philosophy Candidate, College of Control Sceince and Engineering, Zhejiang University Oct 2020–Now
Supervised by Zhihuan Song and Zhiqiang Ge on industrial process data analytics
- Theoretically derived graph mining and utilization of industrial process.
- Derive latent variable learning algorithm from the perspective of optimization/control theory.
- Understanding, Analyzing, and Improving Bayesian inference from the perspective of information geometry.

Research Intern, Microsoft Research AI4Science Asia Apr 2023–Oct 2023
Supervised by Chang Liu and Bin Shao on solving Schrödinger equation with normalizing flow model.
- Development of normalizing flow algorithm.
- Code-base reformulation

Research Intern, Ant Group Aug 2021–Jan 2023
Supervised by Leilei Ding, Jianmin Huang and Wei Chu on cumulative time-series forecasting and large scale multivariate anomaly detection & diagnosis.
- Development of time-series forecasting paper for "red-package" business.
- Development of anomaly diagnosis algorithm for applet monitoring (full-stack).

Undergraduate, School of Chemical Engineering and Technology, Sun Yat-sen University 2016–2020
Supervised by Chang He and Haoshui Yu on chemical process optimization using GAMS.
- Synthesize of "organic Rankine cycle-heat integration-wastewater desalination" Coupled System

Education

Ph.D. Control Theory & Engineering, Zhejiang University (exp.) 2025

B.S. Chemical Engineering & Technology, Sun Yat-sen University 2020

Services

Reviewer,
- **Conference**: ICLR-2024 ICML-2023, ICML-2024, NeurIPS 2024, AISTATS 2025, AAAI 2025, WWW 2025, ICML-2025, ICLR-2025 ,
- **Journal**: IEEE TNNLS

Awards

Undergraduate National Scholarship, Ministry of Education (China) 2018,2019

The First Prize Scholarship of Sun Yat-sen University, Sun Yat-sen University 2017,2018,2019

One Hundred Outstanding Students of Sun Yat-sen University, Sun Yat-sen University 2021

The First Prize Scholarship, Zhejiang University 2020,2021

The SUPCON Scholarship, Zhejiang University 2024

The BYD Scholarship, Zhejiang University 2024

Competences

Languages Chinese (*native*), English (CET-6, 533)

Techniques Python, GAMS, MATLAB, Optimization, Optimal Control

Backends PyTorch, JAX, PyRO

First-Authored Publications (Accepted)

[1] Blending Data and Knowledge for Process Industrial Modeling Under Riemannian Preconditioned Bayesian Framework. *IEEE Transactions on Knowledge and Data Engineering* (CCF-A, IF=10.4, JCR-Q1)

[2] Improving Data-Driven Inferential Sensor Modeling by Industrial Knowledge: A Bayesian Perspective. *IEEE Transactions on Systems, Man and Cybernetics: Systems* (CCF-B, IF=8.6, JCR-Q1)

[3] Diffusion Model-based Numerical Tabular Data Imputation: A Wasserstein Gradient Flow Perspective. *The Thirty-Eighth Annual Conference on Neural Information Processing Systems (NeurIPS 2024), Main Track, Poster* (CCF-A), 2024.

[4] E^2AG: Entropy-Regularized Ensemble Adaptive Graph for Industrial Soft Sensor Modeling. *IEEE/CAA Journal of Automatica Sinica* (Top-1, IF=15.3, JCR Q1, Regular Paper), 2024.

[5] Analyzing and Improving Supervised Nonlinear Dynamical Probabilistic Latent Variable Model for Inferential Sensors. *IEEE Transactions on Industrial Informatics* (CCF-C, IF=11.7, JCR Q1, Regular Paper), 2024. doi: 10.1109/TII.2024.3435466

[6] Variational Inference Over Graph: Knowledge Representation for Deep Process Data Analytics. *IEEE Transactions on Knowledge and Data Engineering* (CCF-A, IF=8.9, Regular Paper), 2023. doi: 10.1109/TKDE.2023.3327415

[7] Unsupervised Anomaly Detection & Diagnosis: A Stein Variational Gradient Descent Approach. In: *CIKM'23* (CCF-B, Short Paper), Birmingham, England, 2023. doi: 10.1145/3583780.3615167

[8] Monotonic Neural Ordinary Differential Equation: Time-series Forecasting for Cumulative Data. In: *CIKM'23* (CCF-B, Applied Research Paper), Birmingham, England, 2023. doi: 10.1145/3583780.3615487

[9] Directed Acyclic Graphs With Tears. *IEEE Transactions on Artificial Intelligence* vol. 4, no. 4, 972-983, 2023. doi: 10.1109/TAI.2022.3181115

[10] Knowledge Automation Through Graph Mining, Convolution, and Explanation Framework: A Soft Sensor Practice. *IEEE Transactions on Industrial Informatics* (CCF-C, IF=11.7, JCR Q1, Regular Paper) vol. 18, no. 9, 6068-6078, 2022. doi: 10.1109/TII.2021.3127204

[11] Stochastic optimization-based approach for simultaneous process design and HEN synthesis of tightly-coupled RO-ORC-HI systems under seasonal uncertainty. *Chemical Engineering Science* vol. 246, 116961, 2021. doi: 10.1016/j.ces.2021.116961

Corresponding-Authored Publications (Accepted & Minor Revision)

[1] SPOT-I: Similarity Preserved Optimal Transport for Industrial IoT Data Imputation. *IEEE Transactions on Industrial Informatics* (CCF-C, IF=11.7, JCR Q1, Regular Paper). doi: 10.1109/TII.2024.3452241

[2] LSPT-D: Local Similarity Preserved Transport for Direct Industrial Data Imputation. *IEEE Transactions on Automation Science and Engineering* (CCF-B, IF=5.9, JCR Q1, Regular Paper). doi: 10.1109/TASE.2024.3506835

[3] Optimal Transport for Time Series Imputation. *The Thirteenth International Conference on Learning Representations (ICLR 2025)* (Regular Paper).

[4] AKGNN: When Adaptive Graph Neural Network Meets Kolmogorov-Arnold Network for Industrial Soft Sensors. *IEEE Transactions on Instrumentation and Measurement* (IF=5.6, JCR Q2, Regular Paper).

Co-Authored Publications (Accepted)

[1] Optimal Transport for Treatment Effect Estimation. *NeurIPS 2024* (CCF-A, Main Track), 2023.

[2] ESCM^2: Entire Space Counterfactual Multi-Task Model for Post-Click Conversion Rate Estimation. In: *SIGIR'22* (CCF-A, Research Article), Madrid, Spain , 2022. doi: 10.1145/3477495.3531972

[3] TMoE-P: Toward the Pareto Optimum for Multivariate Soft Sensors. *IEEE Transactions on Automation Science and Engineering* (CCF-B, IF=5.9, JCR Q1, Regular Paper),2024. doi: 10.1109/TASE.2024.3504736

[4] Entire Space Counterfactual Learning for Reliable Content Recommendations. *IEEE Transactions on Information Forensics and Security* (CCF-A, IF=6.3, JCR Q1, Regular Paper),2024. doi: 10.1109/TIFS.2024.3516584

[5] Label Correlation Biases Direct Time Series Forecast. *The Thirteenth International Conference on Learning Representations (ICLR 2025)* (Regular Paper),2025.

PARTICIPATED FUNDING

[1] Industrial Waste Heat Driven Waste Water Recovery (Sun Yat-sen University Undergraduate Science and Innovation Funding)

- Background: Industrial process has been greatly confronted with inevitable waste heat and waste water. To this extend, how to handle these waste water throughout these waste heat from the perspective of process synthesis with the consideration of the waste water temperature uncertainty is an interesting problem.
- Contribution: We model the waste heat-driven organic Rankine cycle process and reverse osmosis-based waste water processing plant rigorously in GAMS platform. On this basis, we test the integrated system stability by a linear programming model relaxed from an mix-integer non linear programming problem.
- Results: Approved, With the help of the proposed model, the unit product cost of our designed system is lower than those of the conventional reverse osmosis system. We proposed 1 SCI journal paper, 1 EI journal paper, and 1 EI conference paper.

[2] Multi-source Heterogeneous and Low Quality Industrial Data Modeling & Fusion Methodology (National Natural Science Foundation of China)

- Background: Industrial big data has been greatly confronted with low quality property for the existence of the measurement noise. Besides, due to the diversity of the process measurement instruments including but not limited to camera, sonar, etc, how to fuse different data source in the data-driven model to better support the downstream task is a crucial problem.
- Contribution: I wrote the full part "Project Basis and Research Content" (core part) of the foundation application form.
- Results: Approved, A 1, 040 k-valued natural science foundation was approved (2022.01-2024.12).