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国家自然科学基金 资助项目结题/成果报告

资助类别： 青年科学基金项目（C类）[原青年科学基金项目]

亚类说明：

附注说明：

项目名称： 面向流式工业大数据的终身贝叶斯学习与质量预报

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研究成果目录

项目负责人通过系统，从文献库中检索研究成果或者按要求格式自行填入。请按照期刊论文、会议论文、学术专著、专利、会议报告、标准、软件著作权、科研奖励、人才培养、成果转化的顺序列出，其它重要研究成果如标本库、科研仪器设备、共享数据库、获得领导人批示的重要报告或建议等，应重点说明研究成果的主要内容、学术贡献及应用前景等。

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期刊论文

- (1) **Zeyu Yang**; Le Yao; Bingbing Shen; Peiliang Wang; Probabilistic Fusion Model for Industrial Soft Sensing Based on Quality-Relevant Feature Clustering, *IEEE Transactions on Industrial Informatics*, 2023, 19(8): 9037-9047. 第一标注
- (2) **Zeyu Yang**; Longying Mao; Lingjian Ye; Yiran Ma; Zhihuan Song; Zhichao Chen; AKGNN: When Adaptive Graph Neural Network Meets Kolmogorov-Arnold Network for Industrial Soft Sensors, *IEEE Transactions on Instrumentation and Measurement*, 2025, 74(2517813). 第一标注
- (3) **Zeyu Yang**; Tingting Hu; Le Yao; Lingjian Ye; Yi Qiu; Shuxin Du; Stacked Dual-Guided Autoencoder: A Scalable Deep Latent Variable Model for Semi-Supervised Industrial Soft Sensing, *IEEE Transactions on Instrumentation and Measurement*, 2024, 73. 第一标注
- (4) **Zeyu Yang**; Wenqing Gao; Gecheng Chen; Jiaxin Yu; Bocun He; Lingjian Ye; Self-Modified Dynamic Domain Adaptation for Industrial Soft Sensing, *IEEE Transactions on Automation Science and Engineering*, 2026. 第一标注



(5) Longying Mao; **Zeyu Yang**; Bingbing Shen; Xiaoyu Jiang; Le Yao; Zhihuan Song; Edge-Compressed and Energy-Optimized Dual-Domain Graph Network with Variational Gating for Industrial Soft Sensing, *IEEE Sensors Journal*, 2026, 26(2): 2194-2208. 第一标注

(6) **Zeyu Yang**; Ruining Jia; Peiliang Wang; Le Yao; Bingbing Shen; Supervised Attention-Based Bidirectional Long Short-Term Memory Network for Nonlinear Dynamic Soft Sensor Application, *ACS Omega*, 2023, 8: 4196-4208. 第一标注

(7) Weiming Shao; Hongjian Yu; Wenxue Han; **Zeyu Yang**; Junhui Chen; A physical causality-informed generative latent variable modeling paradigm for industrial virtual metrology, *Advanced Engineering Informatics*, 2025, 69(103809). 第二标注

(8) Le Yao; **Zeyu Yang**; Zheng Zhang; Siyuan Tang; Bingbing Shen; Jiusun Zeng; Input Factor Selection Based on Interpretable Neural Network for Industrial Virtual Sensing Application, *IEEE Transactions on Instrumentation and Measurement*, 2023, 72. 第二标注

(9) Bingbing Shen; Jinchuan Qian; **Zeyu Yang**; Le Yao; Multirate Nonlinear Process Fault Detection Based on Multiscale Hierarchical Variational Autoencoder, *IEEE Sensors Journal*, 2024, 24(10). 第二标注

(10) Zhichao Chen; Licheng Pan; Yiran Ma; **Zeyu Yang**; Le Yao; Jinchuan Qian; Zhihuan Song; E2AG: Entropy-Regularized Ensemble Adaptive Graph for Industrial Soft Sensor Modeling, *IEEE/CAA Journal of Automatica Sinica*, 2025, 12(4): 745-760. 第二标注

(11) Bingbing Shen; Le Yao; **Zeyu Yang**; Zhiqiang Ge; Mode Information Separated β -VAE Regression for Multimode Industrial Process Soft Sensing, *IEEE Sensors Journal*, 2023, 23(9). 第二标注

(12) Yiran Ma; Zhichao Chen; **Zeyu Yang**; Xinmin Zhang; Zhihuan Song; Heat Equation Stein Variational Ensemble: Rethinking and Advancing Uncertainty-Aware Soft Sensor Modeling, *IEEE Transactions on Industrial Informatics*, 2024, 20(12). 第二标注



(13) Bingbing Shen; **Zeyu Yang**; Le Yao; Adaptive Temporal-Spatial Pyramid Variational Autoencoder Model for Multirate Dynamic Chemical Process Soft Sensing Application, *ACS Omega*, 2024, 9(21). 第二标注

(14) Ouguan Xu; **Zeyu Yang**; Zhiqiang Ge; Online quality estimation in chemical processes with random subspace deep partial least squares model, *Chemical Engineering Science*, 2025, 306(121295). 第二标注

(15) Junhua Zheng; Lingquan Zeng; **Zeyu Yang**; Zhiqiang Ge; Additive Dynamic Bavesian Networks for Enhanced Feature Learning in Soft Sensor Modeling, *Engineering Applications of Artificial Intelligence*, 2024, 134. 第三标注

(16) Junhua Zheng; **Zeyu Yang**; Zhiqiang Ge; Deep Residual Principal Component Analysis as Feature Engineering for Industrial Data Analytics, *IEEE Transactions on Instrumentation and Measurement*, 2024, 73. 第三标注

(17) Gecheng Chen; Wenqing Gao; **Zeyu Yang**; Xinkai Chen; Jianqiang Li; Chengwen Luo; BiSDA: Bidirectional Self-Refining Domain Adaptation for Streaming-Evolving Industrial Soft Sensing, *IEEE Transactions on Industrial Electronics*, 2025. 第三标注

(18) Ruiyi Fang; Kai Wang; Xiaofeng Yuan; **Zeyu Yang**; Yalin Wang; Chunhua Yang; Multi-step difference-driven domain adversarial network for few-sample fault detection in dynamic industrial systems, *Engineering Applications of Artificial Intelligence*, 2025, 146(110242). 第四标注

会议论文

(1) Tingting Hu; **Zeyu Yang**; Lingjian Ye; Zhe Zhou; Le Yao; Bingbing Shen; A Supervised Stacked Dual-Guided Autoencoder with Deep Learning Networks for Industrial Soft Sensing, *2024 IEEE 13th Data Driven Control and Learning Systems Conference (DDCLS)*, Kaifeng, China, 2024-05-17至. 第一标注



- (2) Longying Mao; **Zeyu Yang**; Peiliang Wang; Knowledge Fusion Graph Neural Network for Industrial Process Fault Diagnosis, *2025 CAA Symposium on Fault Detection, Supervision, and Safety for Technical Processes (SAFEPROCESS)*, Urumqi, China, 2025-08-22至2025-08-24. 第一标注
- (3) Longying Mao; **Zeyu Yang**; Le Yao; Jingsheng Qin; Xiaoyu Jiang; Bingbing Shen; Robust Soft Sensor Model Based on Frequency-Domain Adaptive Graph, *2025 44th Chinese Control Conference (CCC)*, Chongqing, China, 2025-07-28至2025-07-30. 第一标注
- (4) Longying Mao; **Zeyu Yang**; Le Yao; Bingbing Shen; Xiaoyu Jiang; Zhichao Chen; Enhancing Industrial Soft Sensing via Optimized Message Passing in Spatial-Temporal Graph Neural Network, *2025 IEEE 14th Data Driven Control and Learning Systems (DDCLS)*, Wuxi, China, 2025-05-09至2025-05-11. 第一标注
- (5) Wenqing Gao; **Zeyu Yang**; Gecheng Chen; Lingjian Ye; Le Yao; Bingbing Shen; Bidirectional Self-Iterative Domain Adaptation for Industrial Virtual Sensor Modeling, *2025 IEEE 14th Data Driven Control and Learning Systems (DDCLS)*, Wuxi, China, 2025-05-09至2025-05-11. 第一标注
- (6) Ruining Jia; Xinyi Jin; Xinru Ni; Mengjiao Ruan; **Zeyu Yang**; Peiliang Wang; Semi-Supervised Soft Sensor Modeling for Industrial Dynamic Information Mining Based on Two-Path Weight Comparison, *2024 IEEE 13th Data Driven Control and Learning Systems Conference (DDCLS)*, Kaifeng, China, 2024-05-17至. 第一标注
- (7) Yijia Huang; Xinru Ni; Tingting Hu; **Zeyu Yang**; Lingjian Ye; Shuxin Du; A Deep Stacked Dual-Guided Autoencoders for Supervised Industrial Soft Sensing with Dynamic Adaptation Mechanisms, *2025 IEEE 14th Data Driven Control and Learning Systems (DDCLS)*, Wuxi, China, 2025-05-09至2025-05-11. 第一标注
- (8) Bingbing Shen; Le Yao; Xiaoyu Jiang; **Zeyu Yang**; Jiusun Zeng; Time Series Data Augmentation Classifier for Industrial Process Imbalanced Fault Diagnosis, *2023 IEEE 12th Data Driven Control and Learning Systems Conference (DDCLS)*, Xiangtan, China, 2023-05-12至. 第二标注



(9) Mei Tang; Yu Qi; Siyuan Tang; **Zeyu Yang**; Le Yao; Input Variable Relation and Importance Learning for Industrial Process Soft Sensing with Spatial-Temporal Graph Neural Networks, *43rd Chinese Control Conference, CCC 2024*, Kunming, China, 2024-07-28至. 第二标注

(10) Le Yao; Zheren Zhu; Bingbing Shen; **Zeyu Yang**; Xiaoyu Jiang; Cloud-Edge Collaborative Gaussian Mixture Model for Quality Prediction of Large-Scale Industrial Processes, *2024 1st International Conference on Advanced Robotics, Control, and Artificial Intelligence (ARCAI 2024)*, Perth, Australia, 2024-12-09至2024-12-12. 第三标注

专利

(1) **杨泽宇**; 倪心茹; 黄怡佳; 周哲; 杜树新; 一种基于半监督双导自编码模型的工业软测量方法, 2025-05-30, 中国, 202510720926. 6.

(2) **杨泽宇**; 陈嘉辉; 毕祯; 楼俊钢; 基于语义保真与梯度对齐时序大模型的工业软测量方法, 2025-11-25, 中国, 202511743003. 9.

(3) **杨泽宇**; 茅珑瀛; 王培良; 姚乐; 倪心茹; 一种基于信息传播优化时空图神经网络软测量的二氧化碳含量预测方法, 2025-11-11, 中国, 2025116398464.

(4) **杨泽宇**; 高文情; 姚乐; 陈革成; 一种基于双向自细化域适应的流式演化工业软测量方法, 2026-01-06, 中国, 202610011455. 6.

(5) 宋执环; 宋泽宇; **杨泽宇**; 一种基于云边协同的主动学习故障诊断方法, 2023-10-09, 中国, 2023112997265.

(6) 周哲; 刘宇凡; 杜树新; 叶凌箭; **杨泽宇**; 一种基于知识与数据双驱动的厂级分布式过程监测方法, 2025-09-02至2029-11-28, 中国, ZL 2023 1 0230809. 2.

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(1) **杨泽宇**；胡婷婷；基于有监督堆叠改进自编码器的二氧化碳吸收塔工业过程非线性软测量建模软件V1.0, 2024SR0084305, 原始取得, 全部权利, 2024-01-12.

(2) 贾瑞柠；**杨泽宇**；王培良；叶凌箭；周哲；一种基于SA-BiLSTM 的合成氨工业过程动态软测量建模软V1.0, 2023SR0513687, 原始取得, 全部权利, 2023-05-04.

科研奖励

(1) **杨泽宇** (1/1)；2024-2026年度浙江省科协青年人才托举培养项目，浙江省科学技术协会，其他，其他，2024（**杨泽宇**）。

(2) **杨泽宇** (1/2)；2023年度浙江省青年科技工作者优秀论文，浙江省科学技术协会，其他，其他，2024（**杨泽宇**；葛志强）。

项目成果应用前景

本项目成果拟应用领域：1、智能制造

预计在5年以内推广使用



国家自然科学基金包干制项目决算表

项目批准号: 62203169

项目负责人: 杨泽宇

金额单位: 万元

行次	科目名称	金额
(1)	一、项目总经费	30.0000
(2)	二、累计支出数	21.0331
(3)	(一) 项目直接费用	13.6331
(4)	1、设备费	0.0000
(5)	其中: 设备购置费	0.0000
(6)	2、业务费	5.6331
(7)	3、劳务费	8.0000
(8)	(二) 项目间接费用	7.4000
(9)	其中: 绩效支出	5.0000
(10)	三、项目结余数	8.9669
(11)	四、结余资金比例	29.89%

注: 1. 本表中(1)、(2)、(3)、(10)、(11)行为系统自动生成, 无需填写。

- 第(2)行=第(3)+(8)行;
- 第(3)行=第(4)+(6)+(7)行;
- 第(10)行=第(1)-(2)行;
- 第(11)行=第(10)行/第(1)行*100%。