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东北大学(中国)

本人研究兴趣集中在复杂行业场景中的人工智能与大模型应用。我的经历覆盖工业过程建模、多模态分析、智能决策支持与应用系统开发,关注如何将数据、模型和业务问题连接起来,形成可解释、验证、落地的解决方案。相比纯算法背景,我更擅长从真实场景中抽象问题,并推动方法研究走向可用的行业智能系统。

教育经历

2024.09-至今 东北大学(中国)·信息科学与工程学院

控制科学与工程(A+)·博士研究生

2021.09-2024.06 安徽工业大学·冶金工程学院

材料与化工·硕士

2017.09-2021.06 安徽工业大学·电气与信息工程学院

自动化·学士

项目经历

2026.02-至今 负责人 @ 湘雅二医院口腔黏膜皮肤镜多模态大模型虚拟医生

- 搭建面向真实诊疗场景的多模态大模型 Agent workflow, 将皮肤镜影像、患者报告与医学知识接入统一流程, 支撑口腔黏膜疾病分析、推理与虚拟医生辅助诊断。

2025.03-2026.03 负责人 @ 宝武资源某矿业浓密脱水数字孪生大模型

- 构建浓密脱水数字孪生大模型 workflow, 打通现场信号、工况识别、RAG 知识库、Text2SQL 与工具调用, 形成面向一线生产的感知决策软件。

2024.09-2025.12 成员 @ 某国家重点研发计划

- 参与研发 5G 选冶过程终点预测模块, 打通工业数据接入、在线状态估计与 Web 看板联动, 支撑选冶过程状态监测和终点判断。

2023.03-2023.06 负责人 @ 宝武马钢 LF 炉内视觉感知与节能控制项目

- LF 炉视觉感知与节能控制落地, 将现场感知、组网数据与模型预测连接到控制逻辑和生产软件, 服务真实炉前生产场景。

2022.03-2022.12 负责人 @ 宝武长钢炼铁厂出铁流程智能化改造项目

- 出铁流程智能化改造, 打通液位感知、数据通信、算法服务和软件平台, 完成出铁流程数字孪生场景构建与部署。

学术成果

- LLM-driven human-AI collaborative decision support system for complex industrial processes: A case study in metallurgy. Neural Networks (NN), 2026; IF 6.3; CCF-B; JCR Q1; 中科院 2 区; 一作。

- ▶ A meta-contrastive learning hybrid model for adaptive temperature trend prediction in variable ladle preheating. Engineering Applications of Artificial Intelligence (EAAI), 2025; IF 8.0; CCF-C; JCR Q1; 中科院 1 区; 一作。
- ▶ Hybrid grid search and Bayesian optimization-based random forest regression for predicting material compression pressure in manufacturing processes. Engineering Applications of Artificial Intelligence (EAAI), 2025; IF 8.0; CCF-C; JCR Q1; 中科院 1 区; 一作。
- ▶ Zero-shot capillary segmentation in dermoscopy images via SAM2: A case study on oral mucosa. IEEE Journal of Biomedical and Health Informatics (JBHI), 2025; IF 6.8; CCF-C; JCR Q1; 中科院 1 区; 通讯, 共同一作。
- ▶ Iron-tapping state recognition of blast furnace based on Bi-GRU composite model and post-processing classifier. IEEE Sensors Journal (ISJ), 2023; IF 4.5; JCR Q1; 中科院 2 区; 一作。
- ▶ Judgment of blast furnace iron-tapping status based on data differential processing and dynamic window analysis algorithm. Progress in Natural Science: Materials International (PNSMI), 2023; IF 7.1; JCR Q2; 中科院 2 区; 一作。
- ▶ Influence of heavy reduction during solidification process of billets based on 3D reconstruction of dendrites. Journal of Iron and Steel Research International (JISRI), 2025; IF 3.6; JCR Q1; 中科院 2 区; 二作。
- ▶ Investigation of the Mechanism of Central Crack Formation During the Solidification and Reduction Process of GCr15 Bearing Steel. Metallurgical and Materials Transactions B, 2025; IF 3.1; JCR Q2; 中科院 3 区; 三作。

外审中

- ▶ LLM-Guided Task-Semantic Field Factorization for Industrial Process Forecasting. IEEE Transactions on Industrial Informatics (TII); IF 9.9; CCF-C; JCR Q1; 中科院 1 区; 一作。
- ▶ Open-Ended Scenario Reasoning for Specialist Model Adaptation. IEEE Transactions on Industrial Informatics (TII); IF 9.9; CCF-C; JCR Q1; 中科院 1 区; 一作。
- ▶ Widest-Path Reachability Fields for Connectivity-Preserving Slender Structure Segmentation. IEEE Transactions on Neural Networks and Learning Systems (TNNLS); IF 8.9; CCF-B; JCR Q1; 中科院 1 区; 一作。

学术兼职

- ▶ Engineering Applications of Artificial Intelligence (EAAI) 审稿人; IF 8.0; CCF-C; JCR Q1; 中科院 1 区。
- ▶ Knowledge-Based Systems (KBS) 审稿人; IF 7.6; CCF-C; JCR Q1; 中科院 1 区。

专利软著

- ▶ 发明专利, 第一发明人, 一种高炉铁水包出铁状态的判断方法, CN116678473B
- ▶ 发明专利, 第一发明人, 一种高性能材料压缩过程的压力预测方法及系统, CN118506935A
- ▶ 发明专利, 第三发明人, 一种连铸轻压下过程压下量及压力值同频检测装置与方法, CN118533227A
- ▶ 实用新型专利, 第一发明人, 一种基于移动 APP 的家禽孵化智能温湿度调节系统, CN216486166U
- ▶ 软件著作权, 第一著作权人, 智能废钢配料系统、团队智慧平台、冶金智能化数据管理系统等 10 项

技能和语言

- ▶ 语言能力: CET 6。
- ▶ 编程语言: Python、Java、JavaScript、C++。
- ▶ 技术栈: PyTorch、LangChain、RAG、Agent、Workflow、Harness。



YOUCHENG ZONG

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 Northeastern University (China)

My research focuses on AI and large-model applications in complex industrial scenarios. My work covers industrial process modeling, multimodal analysis, intelligent decision support, and applied system development. I focus on connecting data, models, and business problems into interpretable, verifiable, and deployable solutions. Rather than working only on algorithms, I am strong at abstracting problems from real scenarios and turning research ideas into usable industrial-intelligence systems.

Education

2024.09-Present	Northeastern University (China), College of Information Science and Engineering Control Science and Engineering (A+), PhD Candidate
2021.09-2024.06	Anhui University of Technology, School of Metallurgical Engineering Materials and Chemical Engineering, Master of Engineering
2017.09-2021.06	Anhui University of Technology, School of Electrical and Information Engineering Automation, Bachelor of Engineering

Project Experience

2026.02-Present	Project Lead @ Multimodal large-model virtual doctor for oral mucosal dermoscopy at Xiangya Second Hospital <ul style="list-style-type: none">▶ Built a multimodal large-model Agent workflow for real clinical scenarios. It integrates dermoscopy images, patient reports, and medical knowledge into one process to support oral mucosal disease analysis, reasoning, and virtual-doctor-assisted diagnosis.
2025.03-2026.03	Project Lead @ Digital-twin large model for thickening-dewatering in a Baowu Resources mining project <ul style="list-style-type: none">▶ Built a thickening-dewatering digital-twin large-model workflow. It connects field signals, condition recognition, a RAG knowledge base, Text2SQL, and tool calling to form production-facing perception and decision software.
2024.09-2025.12	Project Member @ National Key Research and Development Program project <ul style="list-style-type: none">▶ Developed 5G-enabled endpoint-prediction modules for mineral-processing and metallurgical processes. The modules connect industrial data access, online state estimation, and Web dashboards to support process monitoring and endpoint judgment.
2023.03-2023.06	Project Lead @ LF-furnace visual perception and energy-saving control project for Baowu Magang <ul style="list-style-type: none">▶ Delivered LF-furnace visual perception and energy-saving control for field production. It connects site perception, networking data, and model prediction with control logic and production software.

2022.03-2022.12

Project Lead @ Intelligent transformation of the iron-tapping process at Baowu Changgang Iron-making Plant

- ▶ Built an intelligent-transformation workflow for the iron-tapping process. It connects molten-iron level perception, data communication, algorithm services, and software platforms, and completed digital-twin scenario construction and deployment.

Publications

- ▶ LLM-driven human-AI collaborative decision support system for complex industrial processes: A case study in metallurgy.
Neural Networks (NN), 2026; IF 6.3; CCF-B; JCR Q1; CAS Zone 2; first author.
- ▶ A meta-contrastive learning hybrid model for adaptive temperature trend prediction in variable ladle preheating.
Engineering Applications of Artificial Intelligence (EAAI), 2025; IF 8.0; CCF-C; JCR Q1; CAS Zone 1; first author.
- ▶ Hybrid grid search and Bayesian optimization-based random forest regression for predicting material compression pressure in manufacturing processes.
Engineering Applications of Artificial Intelligence (EAAI), 2025; IF 8.0; CCF-C; JCR Q1; CAS Zone 1; first author.
- ▶ Zero-shot capillary segmentation in dermoscopy images via SAM2: A case study on oral mucosa.
IEEE Journal of Biomedical and Health Informatics (JBHI), 2025; IF 6.8; CCF-C; JCR Q1; CAS Zone 1; corresponding author and co-first author.
- ▶ Iron-tapping state recognition of blast furnace based on Bi-GRU composite model and post-processing classifier.
IEEE Sensors Journal (ISJ), 2023; IF 4.5; JCR Q1; CAS Zone 2; first author.
- ▶ Judgment of blast furnace iron-tapping status based on data differential processing and dynamic window analysis algorithm.
Progress in Natural Science: Materials International (PNSMI), 2023; IF 7.1; JCR Q2; CAS Zone 2; first author.
- ▶ Influence of heavy reduction during solidification process of billets based on 3D reconstruction of dendrites.
Journal of Iron and Steel Research International (JISRI), 2025; IF 3.6; JCR Q1; CAS Zone 2; second author.
- ▶ Investigation of the Mechanism of Central Crack Formation During the Solidification and Reduction Process of GCr15 Bearing Steel.
Metallurgical and Materials Transactions B, 2025; IF 3.1; JCR Q2; CAS Zone 3; third author.

Under Review

- ▶ LLM-Guided Task-Semantic Field Factorization for Industrial Process Forecasting.
IEEE Transactions on Industrial Informatics (TII); IF 9.9; CCF-C; JCR Q1; CAS Zone 1; first author.
- ▶ Open-Ended Scenario Reasoning for Specialist Model Adaptation.
IEEE Transactions on Industrial Informatics (TII); IF 9.9; CCF-C; JCR Q1; CAS Zone 1; first author.
- ▶ Widest-Path Reachability Fields for Connectivity-Preserving Slender Structure Segmentation.
IEEE Transactions on Neural Networks and Learning Systems (TNNLS); IF 8.9; CCF-B; JCR Q1; CAS Zone 1; first author.

Academic Service

- ▶ Reviewer for Engineering Applications of Artificial Intelligence (EAAI); IF 8.0; CCF-C; JCR Q1; CAS Zone 1.
- ▶ Reviewer for Knowledge-Based Systems (KBS); IF 7.6; CCF-C; JCR Q1; CAS Zone 1.

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- › Invention patent, first inventor. Blast-furnace hot-metal ladle iron-tapping state judgment method. CN116678473B.
- › Invention patent, first inventor. Pressure prediction method and system for high-performance material compression processes. CN118506935A.
- › Invention patent, third inventor. Synchronous detection device and method for reduction amount and pressure in continuous-casting soft reduction. CN118533227A.
- › Utility model patent, first inventor. Mobile-app-based intelligent temperature and humidity regulation system for poultry incubation. CN216486166U.
- › Software copyright, first owner. Ten registered software copyrights, including intelligent scrap batching, team collaboration, and metallurgical intelligent data-management systems.

📁 Skills and Languages

- › **Language:** CET-6.
- › **Programming Languages:** Python, Java, JavaScript, C++.
- › **Technical Stack:** PyTorch, LangChain, RAG, Agent, Workflow, Harness.