Zhang Jingxuan

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EDUCATION

Beihang University 2020.09-2025.07
- **School of Software**
- **Degree: Bachelor of Engineering in Software Engineering**

National University of Singapore 2025.08-Now
- **Faculty of Science (Department of Physics)**
- **Degree: Master of Science in AI for Science**

Languages
- **IELTS:** 6.5 (6.0); **French:** B2

RESEARCH EXPERIENCE

Digital Twin Based Intelligent Networked Vehicle Event Data Recorder Manufacture Member, 2021.09-2022.01
- Co-authored a study on digital twin–based manufacturing for intelligent vehicle event data recorders (EDR/DSSAD).
- Designed a system-level architecture integrating sensor data, CAN networks, and digital twin models for accident data recording and reconstruction.
- Evaluated vehicle and autonomous driving data pipelines to support safety analysis, regulatory compliance, and intelligent manufacturing workflows.

Real-Time Battery Fault Early Warning Using CPS-Integrated LSTM/BPNN for Electric Vehicle Power Batteries Leader, 2023.8-2024.9
- Developed a cyber-physical system–based real-time fault early warning framework for onboard EV power batteries under varying environmental conditions.
- Applied LSTM and BPNN to predict battery temperature dynamics and enable a self-updating adaptive battery model.
- Validated on real-world electric bus data, achieving 57s earlier fault warnings, 11.1% lower misdiagnosis, and 8.4% reduced diagnostic failures.

GNNs for Understanding Criticality and Emergent Complexity in Cellular Automata Member, 2025.8-now
- Reformulated cellular automata dynamics as graph-structured data**,** enabling the use of graph neural networks (GNNs) instead of brute-force simulation.
- Designed and implemented multiple graph constructions (e.g. state transition graphs and dependency graphs) and converted them into PyTorch Geometric datasets with consistent node and edge semantics.
- Built an automated pipeline to generate, validate, and serialize large graph datasets, supporting supervised learning with rule-level labels and handcrafted features.

NUSKAKI: Retrieval-Augmented QA System Leader, 2025.9-2025.12
- Designed a modular RAG architecture separating knowledge construction, retrieval, generation, and evaluation, enabling reproducible comparison across lightweight local LLMs.
- Built a domain-specific semantic retrieval pipeline and analyzed retrieval quality as a system-level bottleneck affecting downstream reasoning.
- Developed a question-type–aware evaluation framework and conducted controlled experiments to reveal model capacity vs. grounding trade-offs and reasoning failure modes.

WORK EXPERIENCE

Algorithm Department, Hangzhou Shifang Technology Co., Ltd. Algorithm Intern, 2024.07-2024.10
- Developed data annotation pipelines for multimodal food analysis, and constructed QA datasets using large multimodal models to support model tuning and evaluation.
- Participated in testing and optimization of a multimodal nutrition model, analyzing performance across food category, portion size, and nutritional estimation tasks.
- First author of *NutriVLM: Optimizing Multimodal Models for Comprehensive Nutritional Assessment*, proposing a systematic evaluation framework for real-food image understanding and prompt optimization.

National Alpine Skiing Centre, Beijing 2022 Olympic and Paralympic Winter Games YAS PEM Assistant, 2022.01-2022.04
- Guided and managed the flow of passengers for the cable car, ensured the safe and smooth entry of individuals into the venue, and served over 200,000 visitors, recognized as a “Volunteer Star” and “Outstanding Individual”.
- Assisted disabled athletes with carrying their snow boards and provided translation and guiding services.

PUBLICATION

- First Author, *From Environmental Perception to Intelligent Battery Management: A Novel Real-Time Fault Early Warning Method for Onboard Power Batteries in A Cyber-Physical System,* Journal of Electrical Engineering & Technology, EETE-D-24-03440R2 2025.11
- Fifth Author, *Digital Twin Based Intelligent Networked Vehicle Event Data Recorder Manufacture,* Manufacturing Automation, ISSN1009-0134 2022.11
- First Author, *NutrientHub Multimodal Nutrition Analysis Q&A Platform,* China National Copyright Administration (Software Copyright Registration), 2025SR058668 2025.4