

# 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	

## 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.	
• 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 EVs' Power Batteries	Leader, 2023.08-2024.09
• 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, 2025.08-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, 2025.09-2025.12
• 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.	
NutriVLM: Optimizing Multimodal Models for Comprehensive Nutritional Assessment	Leader, 2024.07-2024.10
• Proposed NutriVLM, a task-specific evaluation framework for multimodal food understanding, covering food type, weight, and nutritional estimation.	
• Constructed a high-quality annotated real-food image dataset (5,000+ images, 10 categories) and benchmarked state-of-the-art vision-language models.	
• Designed a multi-round prompt optimization strategy, achieving consistent improvements in overall nutritional assessment accuracy.	

## 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.	
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".	

## PUBLICATION

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