Xin Huang

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Biography

I am a third-year postgraduate from Beijing Institute of Technology, and expected to graduate in July 2025. My research interests include deep learning (DL) and natural language processing (NLP), and I have been working on log-based anomaly detection (NLP for software engineering), semantic communications (NLP for communications), and multimodal large language models (MLLMs) for solving mathematical problems.

Education

Beijing Institute of Technology (Project 985) **Sep. 2022 - Jun. 2025:** *M.Eng.*
Postgraduate Recommendation
Major in Network and Information Security

China Agricultural University (Project 985) **Sep. 2018 - Jun. 2022:** *B.Eng.*
Major in Computer Science and Technology
GPA: 3.66/4.0 (91.5/100)

Papers

* and † denote corresponding and co-first authors, respectively.

MLLMs for Math **Jun. 2024 - Aug. 2024:** *Done at ByteDance*

[8] Wenwen Zhuang†, **Xin Huang**†, Xiantao Zhang†, and Jin Zeng. "Math-PUMA: Progressive Upward Multimodal Alignment to Enhance Mathematical Reasoning", *AAAI Conference on Artificial Intelligence (AAAI)*, 2025. **(CCF A, Poster)**

- We propose Math-PUMA, a methodology based on Progressive Upward Multimodal Alignment, which enhances mathematical reasoning in MLLMs through a three-stage process.
- We create a large-scale dataset, Math-PUMA-1M, which comprises 692K data pairs and 996K multimodal mathematical data.
- The MLLMs trained with Math-PUMA outperform most open-source MLLMs in MathVerse, MathVista, and We-Math benchmarks.

Log-based Anomaly Detection **Sep. 2022 - Now:** *Cooperated with Peking University*

[7] **Xin Huang**†, Ting Zhang†, and Wen Zhao. "LogRules: Enhancing Log Analysis Capability of Large Language Models through Rules", *Annual Conference of the Nations of the Americas Chapter of the Association for Computational Linguistics (NAACL)*, 2025. **(CCF B, Findings)**

- We propose LogRules, a lightweight log analysis framework that generates and utilizes rules through LLMs.

[6] **Xin Huang**†, Ting Zhang†, Wen Zhao, and Zhiqiang Zhang. "LogIRL: A Log-based Anomaly Detection Method through Inverse Reinforcement Learning and Large Language Models", *IEEE/ACM International Symposium on Quality of Service (IWQoS)*, 2025. **(CCF B, Under Review)**

- We devise an interactive environment and propose LogIRL, the inaugural inverse reinforcement learning (IRL)-based method integrated with a large language model (LLM) for log-based anomaly detection.

[5] Ting Zhang, **Xin Huang***, Wen Zhao, Guozhao Mo, and Shaohuang Bian. "LogContrast: A Weakly Supervised Anomaly Detection Method Leveraging Contrastive Learning", *International Conference on Software Quality, Reliability, and Security (QRS)*, 2023. **(CCF C, Oral)**

- We propose LogContrast, a log-based anomaly detection method that leverages weakly supervised contrastive learning to address the problems of scarce and erroneous log labels in reality.

[4] Ting Zhang, **Xin Huang***, Wen Zhao, Shaohuang Bian, and Peng Du. "LogPrompt: A Log-based Anomaly Detection Framework Using Prompts", *International Joint Conference on Neural Networks (IJCNN)*, 2023. **(CCF C, Oral)**

- We propose a log-based anomaly detection method named LogPrompt, which leverages prompt tuning to enable pretrained language models (PLMs), such as BERT, RoBERTa and ALBERT, to learn more about the representations of logs.

Semantic Communications **Sep. 2022 - Now:** *Research topic of graduating thesis*

[3] **Xin Huang**, Liang Zeng*, Yaojun Lu, and Jianping An. "Secure and Robust Joint Source-Channel Coding with Semantic Clustering and Adversarial Purification", *IEEE Transactions on Cognitive Communications and Networking (TCCN)*, 2024. **(SCI Q1, IF=7.4, Minor Revision)**

- We propose a semantic clustering and adversarial purification-based JSCC (SCAPJSCC) scheme. It not only reduces the computational complexity of the self-attention mechanism but also preserves and leverages the semantic information inherent in images.

[2] **Xin Huang**, Liang Zeng*, Yaojun Lu, and Jianping An. "Improving Autoencoder-Based Deep Joint Source-Channel Coding for Robust Text Transmission through Contrastive Learning", *IEEE Transactions on Cognitive Communications and Networking (TCCN)*, 2024. **(SCI Q1, IF=7.4, Under Review)**

- We introduce a deep JSCC system based on self-supervised contrastive learning for semantic communication in text transmission. Throughout contrastive learning, the model aligns similar samples closely and separates dissimilar ones, thereby fostering the encoder with robust noise resistance.

[1] Chang Li, Liang Zeng*, **Xin Huang**, Xiaqing Miao, and Shuai Wang. "Secure Semantic Communication Model for Black-Box Attack Challenge Under Metaverse", *IEEE Wireless Communications*, 2023. **(SCI Q1, IF=12.9)**

Honors and Awards

- National Encouragement Scholarship **(National, 2020)**.
- "Optics Valley of China · Huawei Cup" The 19th China Post-Graduate Mathematical Contest in Modeling, **3rd Prize (National, 2023)**.
- Mathematical Contest in Modeling and Interdisciplinary Contest in Modeling (MCM/ICM), **Honorable Mention (International, 2020)**.
- The Chinese Mathematics Competitions (CMC), **3rd Prize (National, 2020)**.
- Contemporary Undergraduate Mathematical Contest in Modeling (CUMCM), **Beijing 2nd Prize, (National, 2019)**.

Work

ByteDance **Jun. 2024 - Sep. 2024:** Gauth, AI Engineer (Intern)

I trained multimodal large language models with DeepSpeed for business scenarios. Besides, a paper about multimodal alignment was accpeted by the AAAI 2025 conference.

Momenta **Oct. 2021 - Jan. 2022:** Mpilot, R&D Engineer (Intern)

I developed performance analysis tools for vehicle systems based on Python and C++.

Languages

- Mandarin - Native.
- English - CET-4: 564; CET-6: 490; TOEFL: 84 (R: 28, L: 18, S: 16, W: 22).