Liming Mao

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Education

Beijing University of Posts and Telecommunications (BUPT) - **Artificial Intelligence** - **Master**   Sep 2023 - Jun 2026

- GPA:3.59/4 (Top 10%)
- Member of PRIS Lab (Pattern Recognition and Intelligent Systems)
- Research focus: Time Series Forecasting / Trajectory Prediction

Beijing University of Posts and Telecommunications (BUPT) - **Telecommunication Engineering** - **Bachelor**

Sep 2018 - Jun 2022

Publications

- **Liming Mao, -** "Revisiting Loss Functions for Typhoon Trajectory Forecasting: A Haversine Distance-Based Approach." Accepted at the 9th IEEE International Conference on Network Intelligence and Digital Content (IEEE IC-NIDC 2025).
- Fanda Fan*, Kuiye Ding*, **Liming Mao**. "Next-Scale Autoregressive Forecasting for Time Series via Modular Multi-Scale Decoupling." Under review at the International Conference on Learning Representations (ICLR).Current OpenReview score: 6 / 6 / 4 / 2.OpenReview: https://openreview.net/forum?id=LFiztLOThe(* denotes equal contribution)
- Lei Luo, Xuanzhi Chen, **Liming Mao**, Xinjie Yang, Yajing Xu, Jun Guo. "Bi-directional Generative Retrieval-Augmented Diffusion Models for Document-Level Informative Argument Extraction." Neurocomputing, 2025.DOI: 10.1016/j.neucom.2025.131360
- Lei Luo, Qifeng Qian, Jiahao Luan, **Liming Mao**, Xing Liao, Xuanzhi Chen. "Time-Member Progressive Inference for Long-Term Tropical Cyclone Track Forecasting." IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS), 2025.DOI: 10.1109/JSTARS.2025.3614300

Internship experience

Institute of Computing Technology, Chinese Academy of Sciences   Nov 2025 - Present

- Conduct research on multimodal sequence modeling, focusing on joint representation learning for time series, language, and vision, exploring architectures with generalization and interpretability.
- Design modules such as multimodal alignment, task-oriented generation, cross-modal attention, and sparse gating, organizing code into reproducible research projects.
- Contribute to scientific evaluation systems, performing large-scale heterogeneous data analysis and delivering impactful outcomes.

Huawei Technologies Co., Ltd. - **AI Algorithm Research Intern – 2012 Laboratory**   Jun 2025 - Nov 2025

Project: Intelligent Power Load Forecasting System Based on Multimodal Large Models

- Developed a **multimodal intelligent load forecasting framework** leveraging large-scale meteorological foundation models (e.g., temperature, humidity, and other atmospheric variables). Constructed high-correlation multimodal feature sets for power load forecasting through systematic preprocessing, cleaning, and feature engineering of meteorological data.
- Designed a **sampling strategy combined with local attention mechanisms** to reduce model computational complexity, significantly accelerating training and parameter tuning while maintaining predictive performance.
- Proposed a novel **PeakLoss function** to address extreme-value learning challenges in load forecasting, improving the model's ability to capture peak load behavior and asymmetric error costs.
- Applied **LoRA-based fine-tuning** to mitigate distribution shifts between training data (ERA5 reanalysis data) and real-world deployment data (large-model forecast outputs), enabling robust transfer across heterogeneous data sources.
- Achieved a **0.5% reduction in prediction error** (from 97.3% to 96.8%) while compressing training time from **23 hours**

to 30 minutes, substantially improving experimental efficiency for large-scale model evaluation.

- After integrating **PeakLoss**, improved peak load prediction accuracy by **0.7% (96.5% → 97.2%)**, with overall forecasting accuracy reaching **97.6%**.
- Demonstrated strong generalization under distribution shift via LoRA fine-tuning, achieving **significant robustness gains** while maintaining comparable accuracy (97.3% → 97.1%).

Project experience

Intelligent Typhoon Track Forecasting System Based on Multi-Source Data   -   **Project Leader**   Jun 2024 - Apr 2025

- Built an AI-based system for **6–120 hour typhoon track forecasting** using multi-source data, including NCEP ensemble forecasts, ECMWF ensemble forecasts, and outputs from large-scale meteorological foundation models (e.g., temperature, pressure, wind fields).
- Designed a **Time + Member + Channel fusion framework**, where:1)*Time* captures temporal dependencies,2)*Member* models uncertainty across ensemble members,3)*Channel* enables multi-source feature fusion.
- The framework leverages **DLiner-based modules** to explicitly model temporal correlations and improve long-horizon forecasting accuracy.
- Achieved consistent performance gains across different forecast horizons, with **1.28%–36.0% improvement** over traditional methods in point-wise typhoon track prediction, significantly enhancing operational forecasting support.

Intelligent Medical Knowledge Question Answering System Based on Multimodal Large Models   -   **Project Leader**
Oct 2023 - May 2024

- Constructed a domain-specific knowledge graph using data from the Ministry of Transport and web resources, managed via **Neo4j**.
- Integrated **Qwen-VL** (a multimodal LLM) with the knowledge graph for bridge defect classification, structural identification, root cause analysis, and maintenance advice.
- Designed a two-stage retrieval algorithm with root-priority ranking, combined with intent detection and keyword extraction.
- Developed an interactive **Gradio-based** interface with similar-question recall and prompt rewriting.
- **Result**: Successfully launched the first intelligent QA system in the bridge maintenance domain in China, with expected performance: **92.4% recall, 89% answer confidence**.

Awards

- Second-Class Academic Scholarship, Beijing University of Posts and Telecommunications (2025)
- First-Class Academic Scholarship, Beijing University of Posts and Telecommunications (2024)
- First-Class Academic Scholarship, Beijing University of Posts and Telecommunications (2023)

Courses

- **Mathematics**: Mathematical Analysis, Linear Algebra, Engineering Mathematics
- **Machine Learning**: Machine Learning, Neural Networks and Fuzzy Systems
- **Programming**: C++ Programming and Algorithms, Python Programming and Practice

Skills

- **Programming Languages**: Python (Proficient), C++ (Familiar), Shell (Proficient), Java (Basic)
- **Deep Learning Frameworks**: PyTorch (Proficient, able to implement and extend models), HuggingFace
- **Data Processing and Experimentation**: Pandas, NumPy, Scikit-learn
- **Research and Engineering**: Code reproducibility and reuse, academic writing, experiment design and benchmarking