

ZHANG Lingling

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EDUCATION BACKGROUND

East China Normal University (ECNU)

Sept. 2021-Present

- ♦ **School of Geographic Sciences**
- ♦ **Major:** Geographic Information Science
- ♦ **GPA:** 90.12/100 (Ranking: 2)
- ♦ **English:** IELTS: 7.5
- ♦ **Computer:** Programming language: Python, SQL, MATLAB, C, and C++;
Markup Language: Markdown, and LaTeX
Software: ArcGIS, MS office, and Tableau

RESEARCH EXPERIENCE

Optimization of LSTM-Based Model for River Discharge Prediction

First Author, June 2023-Present

- ♦ Collected runoff data from USGS, soil moisture from SMAP, meteorological forcing from NLDAS, and vegetation index data from MODIS, and processed the data using Google Earth Engine and Python for each basin to compute average values.
- ♦ Built an EA-LSTM model with a static variable input layer to incorporate meteorological time series and geographic features, and designed a feature fusion layer to integrate temporal and static features.
- ♦ Designed comparative experiments to analyze the impact of soil moisture on discharge prediction using the Nash-Sutcliffe Efficiency (NSE), and iteratively adjusted model architecture and parameters.
- ♦ Optimized input variables, incorporated soil moisture and vegetation index based on feature importance, improved NSE from 0.408 to 0.640, and identified the optimal configuration.
- ♦ Completed a 5,000-word academic paper and submitted to Geophysical Research Letters.

National College Students' Innovative Entrepreneurial Training Plan Program

Core Member, May 2024-Apr. 2025

Simulation Optimization and Future Projection of Extreme Heat in China Based on HighResMIP Multimodels

- ♦ Developed and implemented an unequal-weight ensemble optimization algorithm in Python for multiple high-resolution global climate models in HighResMIP, and significantly improved the simulation of regional extreme heatwave events.
- ♦ Created a ResNet-18-LSTM deep learning framework for spatiotemporal data analysis and prediction.
- ♦ Designed a network architecture incorporating feature extraction, temporal processing, and spatial reconstruction to handle 8 time-step features, and trained 100 epochs using AdamW optimizer and SmoothL1Loss.
- ♦ Achieved 0.0025 loss and 0.0706 RMSE on the validation set, and completed predictions of compound extreme heat and heatwave events in China from 2015 to 2050.

College Students' Innovative Entrepreneurial Training Plan Program

Core Member, Apr. 2024-Apr. 2025

Identification and Accessibility Analysis of Outdoor Stadiums in the Yangtze River Delta

- ♦ Collected high-resolution remote sensing images of the Yangtze River Delta using LocaSpace Viewer and preprocessed data by removing null values with Python OpenCV.
- ♦ Built a YOLOv7 rotated object detection framework, annotated four types of stadiums with Labelme, and trained a model to automatically extract precise locations and rotated bounding boxes from remote sensing imagery.
- ♦ Applied path planning combined with the Gaussian two-step floating catchment area method using a 15-minute cycling radius to quantify accessibility between population grids and sports facilities.
- ♦ Identified accessibility-deficient areas and proposed targeted facility optimization plans.

A Spatiotemporal Big Data Approach for Intelligent Housing Price Prediction

Author, Sept. 2024-Nov. 2024

- ♦ Aimed to develop a Python-based housing price prediction system, integrated 90,000+ property listings and POI geospatial data, and automated the full workflow of data acquisition, analysis, and visualization.
- ♦ Managed end-to-end data collection and analysis, designed web crawlers and SQLite databases, handled outliers, engineered spatial and temporal features, and optimized deep learning models.
- ♦ Implemented multi-dimensional feature engineering and an enhanced Deep & Cross Network model, achieved accurate housing price prediction (RMSE: 0.0117), and improved data processing efficiency by 40%.

INTERN EXPERIENCE

Algorithm Department, DeepVerse (Shanghai)

Algorithm Intern, Feb. 2025-Present

Project 1: Optimization of the Relationship Between Temperature Profiles and Production Parameters

- ♦ Aimed to analyze complex relationships between 313 production parameters and temperature profiles for global aluminum alloy wheel manufacturers and reduce the monitoring costs of 552,322 temperature points.
- ♦ Designed waveform extraction and adaptive resampling algorithms, removed 50% of low-quality data, and retained 2,855 high-quality temperature profiles.
- ♦ Applied waveform feature extraction and machine learning algorithms, such as Random Forest and XGBoost, to build a feature importance evaluation framework, integrated PCA, UMAP, and t-SNE for dimensionality reduction, and combined multiple clustering methods to process large-scale temperature data.
- ♦ Developed sensor-location-specific parameter impact models, used K-means sub-clustering and a three-level variable representative point strategy, and conducted stratified sampling and repeatability analysis.
- ♦ Selected 54 core parameters (1/6 of original), maintained 97% prediction accuracy, consolidated 552,322 temperature points into 10 representative clusters (1/50,000), reduced experiment frequency by 30–50%, and delivered parameter adjustment strategies and control panel optimization to clients.

Project 2: Development of a Systematic Quality Evaluation Platform for Materials Science Models

- ♦ Implemented function generators such as Branin and Rosenbrock with parameterized noise to accurately simulate nonlinear relationships in materials science.
- ♦ Developed training data split mechanisms based on various strategies, including LOO, LOCO, and Random, to support model performance evaluation across scenarios.
- ♦ Built an evaluation metric system comprising regression indicators (R^2 , MAE, MSE) and classification indicators (F1-score), and enabled data quality assessment and feature importance analysis.
- ♦ Designed an interactive visualization interface using Streamlit, integrated distributed computing with Dask, enabled real-time comparison between in-house and SOTA models, and automated report generation in HTML/CSV formats.
- ♦ Integrated the platform into the company system, implemented dynamic model updates and batch evaluations to reduce development and validation costs, and delivered comprehensive technical documentation for future expansion.

EXCHANGE EXPERIENCE

Mitacs Globalink Research Internship - University of Sherbrooke

May 2025-Aug. 2025

Machine Learning-based Data Assimilation in Hydrology (Under Professor Marie-Amélie's Team)

- ♦ Aimed to integrate LSTM into hydrological state variable assimilation to enhance runoff prediction accuracy and generalize the framework to multiple basins and models.
- ♦ Developed the RavenModel class, managed Raven executable operations, manipulated state variables, and adjusted initial conditions to enable coupling between physical hydrological and deep learning models.
- ♦ Constructed training datasets from meteorological forcings and Raven open-loop outputs, trained the LSTM to capture dynamic meteorological-hydrological relationships, and applied assimilation corrections using observed runoff.
- ♦ Reimplemented TensorFlow code in PyTorch, improved robustness and scalability, and ensured cross-platform compatibility across Windows, Linux, and macOS.
- ♦ Integrated diverse hydrological models within the assimilation framework, expanded spatial applicability, and provided modular, platform-independent code.

HONOURS & AWARDS

Second Prize for the Contemporary Undergraduate Mathematical Contest in Modeling (Shanghai Division)	Nov. 2024
Third Prize for the 4th Information Technology Service Industry Application Skills Competition (Individual Competition)	July 2024
Honorable Mention for the Interdisciplinary Contest in Modeling	May 2024
Third Prize for the Contemporary Undergraduate Mathematical Contest in Modeling (Shanghai Division)	Nov. 2023
Special Grade Scholarship for Excellent Student, ECNU	Oct. 2024
University-Level Excellent Student Award, ECNU	Oct. 2024
First-Class Scholarship for Excellent Student, ECNU	Sept. 2023
Second-Class Scholarship for Excellent Student, ECNU	Sept. 2022