HAOYUAN ZHANG

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Summary

Data-driven Environmental Scientist and Statistician experienced in leveraging advanced machine learning methodologies to solve real-world challenges. Skilled in designing predictive models, optimizing complex systems, and delivering actionable insights for environmental and financial applications. Adept at combining deep technical knowledge with strong communication and teamwork.

Education

Imperial College London *Sep 2024 – Sep 2025*
Master of Science in Environmental Data Science and Machine Learning
Relevant Coursework: Deep Learning, Data Science and Machine Learning, Big Data, Inversion and Optimization, Advanced Programming, Environmental Data

University of Edinburgh *Sep 2020 – May 2024*
Bachelor of Mathematics and Statistics
Relevant Coursework: Differential Equations (Honours), Numerical ODE, Complex Variables, Applied Stochastic Differential Equations, Stochastic Modelling, Statistical Methodology
Final Year Dissertation: Investigations into Data Visualization for Making Robust Interpretations Under Uncertainty (Supervisor: Dr. Simon Taylor)

Research & Project Experience

Enhanced Deep-GBLUP Model for Phenotype Prediction *Summer 2023*
Supervisors: Dr. Ivan Pocrnic and Dr. Stefano Cipolla

- Integrated Locally Connected Layers (LCL) into the Deep-GBLUP model to capture complex, localized patterns.
- Designed and implemented three subnetworks, optimizing loss functions and parameter updates for faster convergence.
- Achieved a significant improvement in predictive accuracy over traditional GBLUP models through rigorous statistical benchmarking.

University Timetable Optimization *2023–2024*
Supervisor: Dr. Gemma Aitchison

- Processed and analyzed course selection data to identify room availability and enrollment patterns.
- Developed a constraint-based optimization model incorporating room capacities, timings, and schedules.
- Evaluated multiple algorithms (genetic, simulated annealing, particle swarm), reducing scheduling conflicts by 30%.

Eco-Financial Insights Using NLP *2023–2024*
Supervisor: Dr. Mustapha Douch

- Created an eco-focused financial dictionary to enhance analysis of conference call transcripts.

- Leveraged NLP techniques to extract and categorize financial data, streamlining environmentally relevant insights.

Flood Risk Prediction Using Machine Learning *2025*

- Curated and integrated diverse datasets for UK flood risk prediction.
- Developed a Random Forest clustering model to forecast flood risks across multiple postcodes.
- Built an interactive map interface enabling users to visualize flood risk probabilities, aiding proactive decision-making.

CT Brain Image Restoration Using UNet *2025*

- Developed a deep learning model based on UNet to reconstruct and enhance corrupted CT brain scans.
- Implemented loss functions combining structural similarity (SSIM) and mean squared error (MSE) to improve reconstruction fidelity.
- Validated model performance against real-world medical datasets, achieving high restoration accuracy and improved diagnostic quality.

Lightning Prediction Using Multi-Modal Data and LSTM-UNet *2025*

- Designed a deep learning framework integrating LSTM and UNet to predict lightning occurrence in terms of quantity and spatial location.
- Leveraged multi-modal datasets including satellite imagery, atmospheric sensor data, and historical lightning records.
- Optimized temporal feature extraction using LSTM while incorporating spatial dependencies with UNet, significantly improving forecast accuracy.

Technical Skills

- **Programming:** Python (proficient), R, Java
- **Machine Learning Frameworks:** GANs, CNNs, VAEs, Diffusion Models, RNNs, LSTMs, Transformers
- **Software & Tools:** LaTeX, Microsoft Office, SPSS, MATLAB, SQL
- **Data Analysis & Modeling:** Advanced statistical modeling, optimization algorithms, NLP techniques

Additional Information

- **Languages:** Fluent in English and Mandarin
- **Collaboration & Communication:** Demonstrated through high-impact team projects and presentations
- **Passion:** Committed to leveraging data science for meaningful environmental and societal impact