Li He

Victoria, BC.

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Education

M.Sc., *Computer Science, University of Victoria (UVic), Victoria, B.C., Canada* 2024 – Present

- GPA: 8.86 / 9.0 | Courses: Machine Learning, Optimization, Data Mining, Data Model, Networking

M.S., *Electronic and Communication Engineering, Hunan Normal University (HNNU), China* 2016 – 2019

B.S., *Communication Engineering, Hunan University of Science and Technology (HNUST), China* 2012 – 2016

Work Experience

Software Developer (Part-time), Pigeon Communication Limited, Victoria, BC, Canada 2020 – 2021

- Programmed and deployed C-based firmware for Arduino Uno microcontrollers to control experimental hardware.
- Configured and operated UAVs for field experiments, contributing to data collection and system validation.

Postal Clerk, Canada Post, Victoria, BC, Canada 2021 – 2024

- Processed and sorted high-volume mail and packages in a time-sensitive, team-based environment.

Selected Project Experience

Traffic Pattern Analysis and Comparison of Distributed Deep Learning Models
Technologies: PyTorch (DistributedDataParallel), ASTRA-sim, Slurm, NVIDIA DGX-2, Google TPU

- Architected and executed distributed training experiments for models like VGG16 and GPT-3 on Canada's Alliance HPC clusters, achieving 91% model accuracy with minimal communication overhead.
- Utilized ASTRA-sim to model and analyze training performance across various network topologies, identifying fully-connected layers as the primary communication bottleneck.

Large-Scale Text Embeddings & Clustering Using Metadata and Pinecone Embeddings
Technologies: Python, Pinecone, Sentence Transformers, Scikit-learn (PCA, K-Means), KeyBERT

- Built a semantic search pipeline by generating high-dimensional embeddings from a large text corpus using Sentence Transformers and the Pinecone vector database.
- Implemented PCA for dimensionality reduction and leveraged KeyBERT for automated keyword extraction to enrich metadata.
- Deployed K-Means clustering to group related documents, significantly improving search result relevance and speed for text-based applications.

Analysis RED Algorithm Using Markov Chain Model
Technologies: Python, NumPy, Matplotlib, Computer Networking, Performance Modeling, Markov Chains

- Developed a Markov Chain model to simulate and analyze the queueing behavior of the Random Early Detection (RED) congestion control algorithm.
- Conducted a comparative performance analysis of Linear vs. Exponential RED, visualizing the results with Matplotlib.
- Conclusively demonstrated that Exponential RED achieves significantly higher throughput and lower packet latency under simulated network congestion.

Analysis and Prediction of Maternal Health Risk
Technologies: Python, Scikit-learn (SGD, Random Forest), TensorFlow, Pandas

- Engineered and compared multiple machine learning models to accurately classify maternal health risk levels based on physiological data.
- Validated the performance of SGD, Random Forest, and Neural Network classifiers to identify the most effective model for early risk detection.

Professional Experience

IEEE PACRIM'24: being the volunteer and attended several sessions — Aug 21-22, 2024
The First AI Velocity Cup: F1 Tenth Autonomous Racing Event: served as a Judge — Aug 21-22, 2024
Graduate Research Assistant, Hunan Provincial Key Laboratory of Intelligent Computing and Language Information Processing, HNNU, China. — 2016 – 2019

Teaching Experience

Instructor, HNNU — 2018 – 2019

- *C Programming*
  Delivered lectures on the fundamentals of C programming and guided students through hands-on programming tasks during laboratory sessions.

Honors and Awards

2025 **Bronze Medal of the 2024 China International Innovation Competition**, standing out among more than 11,000 research teams worldwide.

2018–2019 **The First Prize Scholarship** awarded by HNNU to students who rank in the Top 3 in their department based on GPA.

2016 **Outstanding Graduate** awarded by HNUST in recognition of outstanding academic record and promising future.

2015 **Outstanding Student** awarded by HNUST for their demonstrated leadership and dedicated volunteering service.

2014 **The Second Prize in Energy Conservation and Emission Reduction Competition** awarded by HNUST to students with a novel idea or product which is beneficial for environment.

Research Publications

[J1] J. Wei, B. Yang, **L. He**, et al, "Design and optimization of low power cabinet lock circuit based on NB-IOT communication," Electronic design engineering, 2019, 27(19): 19-24.

[C1] W. Yang, **L. He**, J. Pan, L. Cai and W. Tang, "StreamMoE: Dual-Stream Pipelining for Accelerated Distributed MoE Training." [*submitted to IEEE INFOCOM'26*]

[O1] W. Yang, **L. He**, L. Cai, A. Sepahi, and J. Pan, "Tile scheduling across multiple paths for smooth interactive 360-degree video streaming." [*to be submitted*]

Practical Skills

- **Programming Languages**: Python, C, MATLAB, SQL, HTML, CSS, Visual Basic
- **Frameworks & Libraries**: Scikit-learn, Pandas, NumPy, Matplotlib, TensorFlow/Keras
- **Tools & Platforms**: Anaconda, Visual Studio, Git & GitHub, Google Colab, Overleaf, Arduino, IAR Embedded Workbench
- **Databases**: MySQL, Pinecone
- **Knowledge**: Machine Learning, Data Mining, Computer Networking, Communication Principles, Optimization Algorithms