

KAIWEN ZHU

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PERSONAL SUMMARY

Software Developer and Data Analyst with experience at Tesla and beyond, specializing in **machine learning, data systems, and large-scale automation**. Proven ability to translate stakeholder needs into **scalable technical solutions**, delivering projects adopted company-wide. Skilled in Python, Power BI, and LLM frameworks, with bilingual proficiency in Mandarin and English for effective cross-team collaboration.

SKILLS

Languages & Tools: Python, JavaScript, HTML, CSS, SQL

Frameworks & Libraries: PyTorch, TensorFlow, Scikit-learn, NumPy, Pandas, Matplotlib

Cloud & Platforms: Google Cloud Platform, AWS, Power BI, Power Apps, Power Automate, SharePoint

Web & Frontend: React (ES6+), REST APIs

Interpersonal skills: communication, collaboration, critical thinking, problem solving

Languages: bilingual proficiency in Mandarin and English

EXPERIENCE

TESLA

Shanghai, China

Software Developer Intern

01/2024 to 06/2024

- **Led the end-to-end Tesla Ops 2070 Project**, independently designing, building, testing, and deploying a closed-loop homework + feedback system (Power Automate+Power BI+SharePoint+Power Apps). Rolled out across all sales training programs, it filled a critical system gap, reduced instructor workload, and received highly positive mentor feedback.
- Consolidated weekly training and performance data from multiple sources, eliminating inconsistencies and **cutting report turnaround from one week to two days** through automated Python pipelines.
- Designed and maintained multiple **Power BI dashboards** to visualize registration, performance, and feedback, enabling managers to make faster, data-driven decisions.
- Developed a **scoring system for Tesla's 2-Star and 3-Star Sales Certification**, which was officially adopted by the Sales Department as the standard evaluation process across all stores in China.

ALCLE ENVIRONMENTAL SOLUTIONS INC.

Toronto, Canada

Data Analyst

02/2023 to 05/2023

- **Addressed the challenge of predicting customer engagement** by designing and training a multi-task regression model (PyTorch, TensorFlow) to forecast key video metrics (CTR, like rate, completion rate), helping clients better evaluate content performance.
- **Improved data comprehension for non-technical stakeholders** by creating visualizations (histograms, pie charts, Power BI dashboards) that transformed complex datasets into actionable insights.
- **Enabled timely, data-driven recommendations** by comparing and interpreting weekly dataset variations, providing clients with ongoing performance insights for decision-making.

UNIVERSITY OF TORONTO

Course Project

LLM Agent Framework With Tool Use and Reasoning

04/2025 to 08/2025

- Built an OpenAI-compatible LLM agent with structured JSON schemas for external tool integration, enabling **scalable and auditable AI workflows**.
- Implemented a **prompt-reflection loop** to enhance reasoning reliability, supporting applications where **decision traceability and risk control** are critical.
- Delivered interactive CLI & Streamlit demos with integrated tools (search, statistics, arithmetic), showcasing **real-time insights and automation potential** for enterprise use cases.

TransCap: A Transformer-based Optimized Image Capt

04/2025 to 08/2025

- Developed an optimized **Transformer-based image captioning model** combining a **ResNet50 visual encoder** and a **multi-head attention decoder**, enabling automatic image-to-text generation.
- Built a **complete training and evaluation pipeline** implementing Teacher Forcing, Beam Search decoding, Early Stopping, and BLEU-4 metric tracking for robust language generation.
- Designed **data preprocessing and vocabulary construction** for the Flickr8k dataset, including tokenization, frequency-based vocabulary pruning, and dynamic padding for efficient batching.
- Enhanced caption quality by integrating **loss scheduling** and **beam-based inference**, outperforming baseline greedy decoding in both accuracy and fluency.
- Conducted **quantitative and qualitative evaluations** with TensorBoard and Matplotlib visualizations to analyze learning curves, BLEU trends, and generated captions.

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GAN-based Contrast-Enhanced MRI Synthesis Framework

01/2025 to 05/2025

- Developed a **GAN-based image-to-image translation framework** to synthesize contrast-enhanced (CE) MRI from non-contrast (NC) MRI, reducing the need for contrast agent injections in clinical diagnosis.
- Designed and implemented **multiple GAN architectures**, including Pix2Pix, CycleGAN, and a customized **dual-discriminator GAN (HdGAN)** for high-resolution MRI synthesis.
- Constructed a **complete medical imaging pipeline**, covering DICOM-to-NIfTI conversion, registration, normalization, and dataset pairing for NC-CE MRI slices.
- Optimized the training process with **adversarial loss + L1 reconstruction loss**, Adam optimizers, and learning rate decay, achieving improved **PSNR** and **SSIM** over baseline models.
- Evaluated the synthesized CE-MRI both **quantitatively (PSNR, SSIM)** and **qualitatively** with radiologist feedback, demonstrating clinical potential for diagnostic image enhancement.

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Movie Review Analysis

09/2024 to 12/2024

- Designed ML pipelines for **sentiment classification, score regression, and critic identification**, demonstrating expertise in both classification and regression tasks.
- Implemented and compared two approaches:
 - **TF-IDF + traditional ML models** for faster training and interpretability.
 - **BERT embeddings + tree-based models** for contextual understanding and higher predictive accuracy.
- Highlighted potential applications such as **content recommendation, automated review moderation, and customer feedback analysis**.
- Explored optimization strategies including **multi-task learning, hyperparameter tuning, and performance benchmarking** to balance accuracy and explainability.

EDUCATION

MASTER OF ENGINEERING: ELECTRICAL & COMPUTER ENGINEERING

08/2025

University of Toronto, Toronto

BACHELOR OF TECHNOLOGY: SOFTWARE ENGINEERING TECHNICIAN

12/2023

McMaster University, Hamilton, Canada

Graduated in 12/2023

COLLEGE DIPLOMA: COMPUTER ENGINEERING TECHNOLOGY

05/2021

Mohawk College, Hamilton, ON