DAYOU MAO

4B Computer Science Student @ University of Waterloo

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GitHub LinkedIn WebSite

TECHNICAL SKILLS

- Languages/Tools: **Python**, **C++**, **CUDA**, **Java**, SQL | Git, Docker, AWS, Apache Kafka, Kubernetes.
- ML Libraries: **NumPy**, **PyTorch**, **TensorFlow**, scikit-learn, OpenCV, Matplotlib, Caffe, SciPy.

WORK EXPERIENCES

Vision and Image Processing Lab Jan 2023 – Present · 4 mos
Research Assistant - Computer Vision *Waterloo, ON, Canada*

- Research on **multi-task learning** and identification of hard features.
- Research on **explainable AI** for autonomous vehicles and report to Transport Canada.
- Research on copyright detection for **GAN** and **diffusion** models.

University of Waterloo May 2022 – Aug 2022 · 4 mos
Research Assistant - Optimization *Waterloo, ON, Canada*

- We proposed a novel formula for projection operations with theoretical proof of correctness and empirical results demonstrating the acceleration it brings to the class of alternating projection algorithms.
- Preprint: Bauschke, Heinz H., Dayou Mao, and Walaa M. Moursi. "How to project onto the intersection of a closed affine subspace and a hyperplane." *arXiv preprint arXiv:2206.11373* (2022).

NVIDIA Corporation Jan 2022 – Apr 2022 · 4 mos
Computer Vision Engineer - Autonomous Vehicles *Santa Clara, CA, United States (Remote)*

- Implemented new **data pipeline** to create clean datasets for model development and comparison.
- Enriched **training pipeline** by implementing and testing more learning rate schedules, sampling mechanisms, and refactoring code for neural network implementation.
- Proposed improvements on training config and **stabilized the training process** and **reduced training time** from ∼20h to ∼3h. Significantly sped up model development.
- **Improved F_1-score** of a traffic light classification model by ∼**1%** on **end-to-end KPI** test sets by hyper-parameter searching from 1000+ experiments.
- Debugged memory, latency, and **performance tests** for multiple classifier nodes on different platforms.

MIND Technology, Inc. May 2021 – Aug 2021 · 4 mos
Machine Learning Engineer - Object Detection *The Woodlands, TX, United States (Remote)*

- Generated **synthetic data** of lobster pots, human bodies, and mines for **model pretraining**.
- Achieved **near 1.0 confidence** on synthetic data after fine-tuning the network topology and weights from a **RetinaNet** trained on MS COCO dataset.
- Researched on deployment onto Google Edge TPU with **TensorFlow Lite** and NVIDIA Jetson Nano with **TensorRT**, and profiled the usages.

PROJECTS

Computer Vision Code Base (PyTorch) (TensorFlow) Jan 2021 - Present · 2 yrs 4 mos

- Production-level implementation of **data input**, model **training**, model **evaluation** pipelines and well-known models for **image classification**, **object detection**, and **semantic segmentation** tasks.

Machine Learning Knowledge Base Jan 2021 - Present · 2 yrs 4 mos

- Compilation of papers and notes in machine learning with a focus on **CNN**, **Transformer**, **GAN**, and **diffusion models**. Other topics include **multi-task learning**, **XAI**, and **NERF**.

EDUCATION

University of Waterloo, Canada Sep 2019 - Present · 3 yrs 8 mos

- Triple major in **Computer Science**, **Statistics**, and **Optimization** with faculty average ∼93%.