# Mehrdad Momeni Zadeh

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## Skills

**Languages & Frameworks:** Python, C/C++, Go, Java, MATLAB, R, SQL

**Libraries:** PyTorch, scikit-learn, TensorFlow, Wandb, Hydra, JAX, NLTK, OpenCV, CMake, Gin, Chi (Go)

**Technologies:** Docker, Git, Google Cloud Platform, Kubernetes, Linux (Ubuntu), CLI, RabbitMQ

**Methodologies:** Agile (Scrum), Functional Programming, OOP

## Experience

**DeLTA Lab — Simon Fraser University** Burnaby, BC

*Undergraduate Researcher — Scientific Machine Learning* *Jan 2025–Present*

- **Second author** (and sole undergraduate) on ***NeurIPS 2025*** paper *"Learning Data-Efficient & Generalizable Neural Operators via Fundamental Physics"*, co-led with Ph.D. student Siying Ma under **Prof. Wuyang Chen**.
- Led the **Transformer** branch of a hybrid operator model, trimming normalized RMSE by **11.5%** across **five** PDE benchmarks and cutting training time per epoch **4×** versus baseline FNO.
- Implemented the Transformer path with **rotary positional embeddings** and **token mixers**; matched FNO accuracy in half the epochs and remained stable over **5**-step autoregressive roll-outs.
- Built a **mixed-precision, multi-GPU** PyTorch pipeline (8× RTX 6000 Ada *plus* **Google Cloud TPU v4** nodes) that cut epoch time by **75%** (3 h → 45 min) and enabled rapid hyper-parameter sweeps with **Hydra** + **Weights & Biases**.
- Authored experiment runners, ablation scripts, and evaluation dashboards; packaged code and pretrained weights with step-by-step installation docs for the lab's open-source release.

## Projects

**RageVision – Twitch Emotion Classifier** | *Python, PyTorch, MobileNetV2* | *GitHub* *Jan 2025 – Mar 2025*

- Curated and labelled **10 800** image frames from **120** Twitch clips to build a balanced "rage / non-rage" dataset; automated video-to-frame extraction with OpenCV.
- Fine-tuned a frozen **MobileNetV2** backbone with dropout and a linear classifier, achieving **86%** accuracy, **0.90** recall on rage, and **0.82** on non-rage.
- Ran six systematic sweeps (learning rate, dropout, batch size, data augmentation, freeze vs. fine-tune, optimiser) and prototyped an audio-plus-video late-fusion model that reached **79%** accuracy.

**Neuro Driver** | *Python, Pyglet, Genetic Algorithms* | *GitHub* *Oct 2024–Dec 2024*

- Developed a **2D car simulator** with a custom feed-forward neural network, reducing collisions by **20%** over 50 training generations.
- Wrote a complete **genetic algorithm** (selection, crossover, mutation) that boosted track-completion rates by **30%**.
- Automated multi-track experiments via **Makefile** scripts, streamlining parameter sweeps and visualisation.

**Micro Gopher** | *Go, Docker, Kubernetes* | *GitHub* *Aug 2024–Nov 2024*

- Re-engineered a monolith into a distributed **Go micro-services** platform, improving scalability and fault isolation.
- Shipped core services—frontend, auth (**Postgres**), logging (**MongoDB**), **RabbitMQ** listener, mailer—communicating via REST, RPC, gRPC and AMQP.
- Deployed with **Docker Swarm** and **Kubernetes**, supporting high-volume traffic and rolling updates with **<10 min** downtime per release.

## Education

**Simon Fraser University** Burnaby, BC

*B.Sc. Computer Science (Minor in Mathematics)* *GPA: **3.5 / 4.33***

*Expected Graduation* *Dec 2026*

- **Dean's Honour Roll** (2024).
- **Relevant coursework:** Data Structures, Machine Learning, Deep Learning, Affective Computing, Computer Vision