Xin Lei Lin

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Technical Skills

Lanuguages Spoken: French (Native), English (Native), Mandarin (Fluent), Spanish (Proficient)
Programming Languages: C/C++, Python, R, Java, SQL, Dart (Flutter), JavaScript, HTML/CSS
ML/DS Tools: Torch, CUDA, DDP, Lightning, Tensorflow, OpenCV, Pandas, Numpy, Compute Canada (slurm)
Other Tools: Linux, Docker, Tmux/Vim/VSCode, Git/GitHub, Flask/DJango, React, MongoDB/Postgres

Experience

Machine Learning Researcher with Prof. Babak Taati February 2024 – Present
KITE Computer Vision Lab (University of Toronto) *Toronto, Ontario, CA*

- From **image-by-image** to **video** 2D human pose detection through **VideoMamba and InfiniAttention**.
- Experimented with VideoMamba and Vision Transformers **encoders** & Multi-head Attention, 3D-convolutional neural networks + 3D-deconvolutions, and Multi-layer perceptron **decoders** for **SMPL mesh recovery** and **keypoints coordinates regression** from heatmaps. Added an InfiniAttention **backbone** for videos (32 frames).
- **Pretrained** the autoencoder on MS-COCO pose (136K frames) & **trained** the Infini-Attention video backone on JHMDB (10K frames) and FreeMan (11M frames) resulting in SOTA accuracy for noisy videos. Github

Machine Learning Engineer July 2024 – Present
Kadist *(Remote) – San Francisco, California, US*

- Deployed **rsonart.com**, an art gallery chat web application with vision and audio capacities for **Kadist**.
- Implemented Retrieval-Augmented Generation (RAG) with history-aware & ensemble retrieval, rerank and FAISS.
- Generated embeddings of **308768 artists** and **2851 artworks** webscraped from **ArtFacts**, Kadist and **e-flux**.
- Hosted a Flask (Gunicorn/Nginx) backend, a NEXT.JS frontend and Google login + MongDB for user data.

Machine Learning Researcher with Prof. Houari Sahraoui October 2022 – September 2023
DIRO (University of Montreal) *Dallas, Texas and Montreal, Quebec*

- Experimenting with **computer vision architectures** to translate American Sign Language to English.
- Developed and compared 5 models (Fine-tuned Resnet + CNNs / LSTM + MLP) to translate **25 gestures**.
- Represented **Team Canada (top 12 projects nationally)** at the **International Science and Engineering Fair** 2023 in Dallas, Texas ($15000+ in awards). ISEF Project

Projects

PlasmidAI – International Genetically Engineered Machine (Toronto Team) April 2024 - Present

- Developed plasmid.ai, the largest open-source ML toolkit for plasmid foundation models with Prof. Garton.
- Fine-tuned Evo (a Striped-Hyena genome model) to generate plasmids with antibacterial resistance. Github

Red Handed – MakeUofT (2^{nd} for Qualcomm and Flow ($1200)) February 2024

- Integrated **3 vision** models to detect drowsiness (Tensorflow, MediaPipe & OpenCV – 95% accuracy).
- 3D printed design of slapping machine that tracks and adjusts to nose height for optimal slapping. Devpost

Re.Live – UofTHacks 11 (Cohere 1^{rst} Prize ($1500)) January 2024

- Integrated a **diffusion model – DDPM** model to produce videos of people from static images dancing!
- Integrated **Cohere RAG** to search a database of 100 songs with the user's mood. Frontend in **React**. Devpost

SpaCey – UTRA (Best use of Flow & Starknet ($1000)) January 2024

- Implemented MediaPipe hand-tracking through **3 different hand signals** to control a bluetooth rover. Devpost

DriveSense – HackTheNorth (Winning Finalist Project) September 2023

- Mobile app to assist drivers with **vision models** for car plates, traffic lights and road signs (PyTorch). Devpost

AIBERT – Science Fair ($1000 in various awards) September 2021 – May 2022

- Natural Language Processing (BERT, Naive Bayes & LSTM) with 10000 messages for bilingual spam detection.
- Implemented PostgreSQL database (1 million numbers), Flutter mobile app & Flask backend. Github

Education

University of Toronto – St-George (Trinity College) Toronto, Ontario, CA
Bachelor of Science – Computer Science Specialist (COOP), and Molecular Genetics Major *Aug. 2023 – May 2027*

- Notable awards: **C. David Naylor Scholarship** ($20000) & **Arts and Science Scholar** ($7500)
- Extra-curriculars (high school included): **5-time re-elected president** of student council, **2-time editor-in-chief** (40 writers & 160 pages), and **Vice-President/organizer of 3 hackathons** (800+ participants).