DAVID YUCHEN WANG

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As a current master's student studying Computing and AI at the National University of Singapore, I have over 3 years of work experience in the deployment and research of generative AI models, reinforcement learning, computer vision, and deep learning. I am a quick learner, an excellent team player, and possess strong work ethic. I am fluent in English and Mandarin, currently hold a Canadian citizenship and am seeking full-time opportunities starting January 2025.

EDUCATION

National University of Singapore **Aug 2023 - Dec 2024 (expected)**

Master of Computing - Specialization in Artificial Intelligence

Thesis: Event-based cameras for 3D scene reconstruction

Courses: Probabilistic Graphical Models, Deep Learning, Distributed Systems, AI Decision making, 3D Computer Vision, Natural Language Processing, Big Data Systems

University of British Columbia, Canada **Sep 2018 - May 2023**

Bachelor of Applied Science - Major in Engineering Physics, Minor in Commerce.

- UBC Presidential Scholars Award Recipient, Dean's Honors List

WORK EXPERIENCE

Algorithm Engineer **Jun 2024 - Present**

TikTok Singapore - https://www.tiktok.com

- Developing multi-modality machine learning models combining video and text for enhancing the performance of TikTok video deduplication systems.
- Optimized video feature extraction following methods from SAM, SWINL, Diffusion, YOLO, and DINO and implemented improvements to model architecture, training strategies, and data pipelines to improve validation metrics by over 10%.

Edge AI Developer **Aug 2023 - May 2024**

Pensees Singapore - https://www.pensees.sg

- Adapted state-of-the-art generative **diffusion pipelines** for iOS using SwiftUI and Bazel, leveraging enhancements with **CoreML, MPS**, and **Metal** to achieve native on-device functionality with platform-specific optimization.
- Spearheaded the project development, integrating insights from weekly analyses of cutting-edge **research papers** to enhance team expertise and guide project trajectory, built and launched an **AI-drawing app** within 2 months.
- Acquired and applied expertise in various cutting-edge methods for use and deployment of large-scale image diffusion models, including **controlNet, LoRAs, consistency models**, and **NLP prompting**.

Machine Learning Research Assistant **May 2021 - Aug 2023**

TRIUMF - Canada's Particle Accelerator Centre - https://www.triumf.ca

- Developed **Bayesian Optimization** model to optimize particle beamlines and boost speed by 2400% and accuracy by 120% compared to human operators.
- Designed efficient physics simulations for use on policy gradient **reinforcement learning** models. Integrated first AI-controlled interface on particle accelerators.
- Published experimental findings as first author in paper *Accelerator Tuning with Deep Reinforcement Learning* and gave video and poster presentation at **NeurIPS 2021** workshop.

Machine Learning Engineer **May 2022 - Sep 2022**

Yakoa.io - Web3 Startup - https://www.yakoa.io

- Implemented **image segmentation** framework in PyTorch from research papers to detect fraudulent features in NFT images with high accuracy.
- Deployed **self-supervised classification** models on AWS instances and fine-tuned models on a dataset of 8 million images, improving model run-times by over 300%.
- Employed **statistical analysis** of latent space of self-supervised models. Optimized hyperparameters and visualized results using Weights & Biases, leading to 150% improvement in validation accuracy.

AI Research Intern **Jan 2020 - May 2020**
Huawei Technologies Canada - Vancouver Big Data Lab

- Enhanced **data-preprocessing** speeds for large image datasets by 300% through designing scripts in Python and Bash.
- Boosted team productivity by 500% through configuring **custom environments** in Docker to allow parallelization of model training through cloud GPU clusters.
- Fine-tuned **deep-learning** models for **image classification** and **object detection** in TensorFlow and PyTorch. Organized documentation and presented findings to team, leading to 120% improvements on model accuracy.

Captain and Navigation Sub-Team Lead **Sep 2019 - May 2023**
UBC AgroBot - Student Engineering Design Team - https://ubcagrobot.com

- Devised project roadmaps, established a 2-year budgeting timeline, and utilized **Agile methodology** to manage a team of 70 members across 6 sub-teams to bring robot to the 2023 METRICS ACRE international competition.
- Led a team of 8 members to integrate software with hardware systems onboard robot. Interfaced with camera, lidar, and gyro sensors and utilized **computer vision** and PID control to achieve **autonomous navigation** through crop fields.

SKILLS

Programming languages: Python, Java, Swift, MATLAB, C++, C, C#, Julia, R, HTML, CSS
Libraries: PyTorch, Pandas, TensorFlow, Keras, OpenCV, Numpy, SciPy, Matplotlib, Weights & Biases
Frameworks: HDFS, Linux, Bash, Bazel, Xcode, Slurm, ROS, Gazebo, AWS, GIT, Docker, Conda, Arduino

PUBLICATIONS

Accelerator Tuning with Deep Reinforcement Learning - https://ml4physicalsciences.github.io/2021/files/NeurIPS_ML4PS_2021_125.pdf
NeurIPS 2021 - Workshop for Machine Learning and the Physical Sciences

PROJECTS

Vector Quantized Variational Autoencoders for White Blood Cell Detection **Sep 2021 - Apr 2022**
NUS Deep Learning Project

- Designed a custom, novel **deep learning** architecture in PyTorch, by stacking **vector-quantized variational autoencoders**, allowing **self-supervised pretraining** and **few-shot learning** on the classification of white blood cells.
- Implemented **custom data loaders**, and trained model in **Slurm** clusters to achieve 98% testing accuracy, as well as 90% testing accuracy using a 1% subset of training data.

Self-Driving and License Plate Detection **Jun 2021 - Sep 2021**
UBC ENPH 353 Project Course

- Utilized Robotic Operating System (**ROS**) with **computer vision** algorithms to steer an autonomous vehicle through a simulated world and avoid moving obstacles with 0% collision rate.
- Generated custom datasets and trained **deep neural network** models in TensorFlow Keras to identify license plates in a noisy environment and classify their characters with 90% accuracy.
- Led labs and tutorials as a **Teaching Assistant** in next year for a class of 3rd year students and provided guidance in course concepts, software architecture, and working within **Linux** environments.

Autonomous Recycling Robot **Jul 2020 - Aug 2020**
UBC ENPH 253 Project Course

- Designed and soldered custom **PCBs** to interface with an STM32 micro-controller, with consideration of power limits, current distribution, and noise isolation.
- Investigated PCBs using an oscilloscope and a multimeter to discover and fix 100% of circuit issues.
- Implemented **PID control** system in C++ using reflectance sensors and employed sonar to collect and deposit soda cans with 80% accuracy.

LEADERSHIP EXPERIENCE

Captain - UBC AgroBot Design Team **(Sep. 2022 - May 2023)**
Grad Year Representative - UBC Engineering Students Council **(Sep. 2022 - May 2023)**
Teaching Assistant - UBC **(2020 - 2023)**
3rd year Machine Learning Project Course, 1st year Introductory Physics Course, 1st year Experimental Physics Course
President of Environment Club - Dover Bay Secondary School **(2015 - 2018)**