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.
- Analyzed baseline models and implemented improvements to model architecture, training strategies, and data pipelines to improve validation metrics by over 8%.

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)**

Distributed Multi-server Game Design Sep 2022 - Dec 2022

NUS Distributed Systems project

- Designed and built distributed peer-to-peer maze game leveraging Java RMI, socket communication, and multi-threaded server logic capable of adapting to node failures while maintaining a consistent game state.
- Achieved 100% pass in extensive stress test, thoroughly validating system's scalability, crash-tolerance, and throughput.